# Color Emotion Based on CNCS Color System $^\star$

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**Abstract**

In this study, color emotion based on CNCS color system was investigated. The research included single color preference and multi-color coordination emotion. Six themes of International Textile color traded were selected as color samples. At the first step, forty-two single colors were regarded as color samples for color preference survey. At the second step, twenty-four kinds of color coordination were made according to six color concepts, and color emotion survey for multi-color coordination was conducted. In the second part, fifteen color emotion scales such as "modern-classic", "formal-casual", "gaudy-tasteful", "lively-stiff", "intellectual-nonintellectual", "like-dislike" and so on were selected according to Semantic Differential Method. The survey was conducted among the undergraduate college students from Xi'an Polytechnic University. Color histogram was used to express the result of single color preference. It was clear that the popularity of these released colors was not average and the more favorite colors were pale chromatic colors. Factor Analysis and cluster analysis were used to conduct the data from the second part survey. Three factors were extracted and labeled "personality", "taste", and "fashion". Twenty-four multi-color combinations were classified into three groups. It indicated that the comprehensive color emotion was more important than other factors.

*Keywords*: Color Preference; Color Emotion; Multi-color Combination; Semantic Differential Method; Factor Analysis

# 1    Introduction

International Commission of Color hold the first meeting in 1963. From then on, some countries began to found their own association of color one after another. These societies were responsible for forecasting and releasing fashion color. During some decades development, the trend report was referred by more and more companies and designers. The fashionable colors were released by themes, each theme included a series of colors. There were twice (spring-summer and autumn-winter) each year [1]. Were these colors really popular? It would be confirmed in this study.

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In our previous study, color psychology for single color was investigated, and compared between Chinese and Japanese. It has been concluded that the respondents were inconsistent to abstract meaning of color and color preference, but consistent to natural color and custom [2-5]. Uravis Tangkijviwat researched the relationship between color preference and the mode of color appearance. The result showed that color preference is dominated not only by color attributes but also by the mode of color appearance [6]. Iris Bakker studied color preferences for different topics in connection to personal characteristics. It indicated that color preferences were dependent upon the topic, and personal characteristics [7].

Color preference is one kind of color emotion. Color emotion shows more complicated psychology. Many researchers had studied color emotions.

Li-Chen Ou et al. had studied color emotions for single-color and two-color, a color-appearance-based model was established for color-combination emotions. With this model one can predict color emotions for a color pair if color-appearance attributes of the component colors in that pair are known [8, 9].

In this study, one set of colors released by China Fashion Color Association were regarded as color samples. Single color preference and multi-color emotion were investigated respectively. The aim was to test the reliability of color trends and to propose better way of using color trends.

## 2 Method

### 2.1 Stimuli and Questions

In this study, the colors in six themes of International Textile color trades were regarded as basic colors. The six themes were sublimation, filtering, gradation, natural blue tone, roadway, hanging. There were forty-two colors in total and each color was expressed by CNCS color system. These colors were renamed respectively according to their themes in order to facilitate the description. For example, the first theme "sublimation" included seven colors, and the first color of the first theme was named "T1-1". The color names and color rectangles were showed in Table 1 with color values in RGB and CIE 1976 L∗a∗b∗ system together. From these color rectangles we could see most colors were grayish or similar to gray. It indicated that it was more possible to become popular for achromatic colors and colors similar to achromatic color.

Semantic Differential Method was used in this study. Semantic differential is a type of a rating scale designed to measure the connotative meaning of objects, events, and concepts. The respondent is asked to choose where his or her position lies, on a scale between two bipolar adjectives. Semantic differentials can be used to measure opinions, attitudes and values on a psychometrically controlled scale. According to Semantic Differential Method, stimuli for investigation and some bipolar adjectives for questionnaire were prepared firstly.

In the released six themes, there were several kinds of color coordination. According to the color coordination, twenty-four multi-color combinations were made as the appearance of Chinese Jiugongge shown as Fig. 1, which could express the main color and secondary color. In the aesthetics of fashion color coordination, contrast must exist which may be various aspects, such as lightness, saturation, hue, area.

Fifteen pairs of color emotion words were used in the second part of survey: modern-classic, vulgar-elegant, formal-casual, fresh-stale, gaudy-tasteful, lively-stiff, implicit-flaunty, gorgeous-