

Difference in the Color Preference by a Geographical Factor

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Abstract—Recently, the design is becoming important in product development. The technology which is a strong point of Japan is immediately caught up by the foreign countries, and the price competition begins. Therefore companies tend to plan differentiation of products by the design or a color. The purpose of my work was to consider the optimal color for using by product development. We needed to clarify the thing leading to color preference for this purpose. Two kinds of investigations were made. By the first investigation, we found out that a geographical factor difference existed in color preference. Then, investigation which regarded the difference as latitude was conducted. However, the result expected from the difference in latitude was not obtained. It seems that it is necessary to set up difference of latitude a little more greatly, or to reexamine by other geographical factors.

Keywords—Color preference, product color, difference of latitude, design marketing, international comparison.

I. INTRODUCTION

IN the household appliances or the cars, the products of various colors and designs have appeared on the market. The trend color of fashion is always many people's concerns.

However, what kind of color should be adapted to what kind of product? How many colors should be developed to the product of the same form? Moreover, when entering to a market in the foreign country, is it necessary to adapt a color? Although the social needs of these subjects are great, a steadfast established theory does not exist.

A. The Conventional Research on Color Preference

Previous research has suggested that nature and culture are the explanation factors which specify the preference and image of a color.

1. Psychology

For example, in the domain of psychology, they attracted attention from various viewpoints, such as preference formation from infancy (developmental psychology), influence of social environment (social psychology), and influence by experiment operation (cognitive psychology). It is said that especially people's color preference changes with age. Persons like red and yellow when they are young, then they come to like green and blue as they grow up [1]-[4]. Moreover, Garth reported that the color preference of infancy was similar and changed by education [5]. That is, there are two viewpoints that the color preference was bred in the bone [6], [7] or gained by study [8], [9].

International comparison researches have shown that the

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influence of age, sex, and a race appears in color preference strongly [10]-[13]. Moreover, concerning a color, there is not only preference but argument that consciousness, a meaning, etc. change by culture [14].

2. Geography

On the other hand, the factor relevant to color preference is mentioned also in the domain of geography. Sato showed following five as a geographic factor related to color preference [15]. One is temperature. Those who live in the warm area are adapted for warm color easily, and those who live in the chill area easily adapted for cold color. The difference of temperature influences the taste of hue. The 2nd is humidity. Humidity is related to the perception of clear colors and muddy colors. The 3rd is daylight hours. An illumination difference tends to induce adaptation of light and darkness. The 4th is a color of the ground and the last is the difference of latitude of available light. Especially we paid our attention to this difference of latitude. Illumination differs greatly in the equatorial belt, the north-south polar band, and the middle zone, and influences brightness and chroma saturation.

B. Unresolved Points in Conventional Research

Next, research of the color has been reviewed from the viewpoint of product development. According to the literature of Meyers-Levy & Peracchino [16], a color is used in order to judge the merit of the product's quality; moreover, the color is bearing the role which strengthens an advertising impression. In addition, Garber et al suggested colors are the main elements of a package and demonstrate effects [17], like a vivid color remain in memory. But, as far as we know, there have been few reports about how consumers quantify evaluation of a color. In addition, in the international marketing domain, most of standardization and adaptation about a design was not studied. It was not studied how the color of a product should be adapted to the taste of a country.

The purpose of this paper is to examine the difference of the color preference and its factor. For the purpose, two investigations were conducted in the following procedures.

II. SURVEY-1

First of all, performing comparison of the East and the West, it checks that the geographical and cultural difference has also influenced color preference.

A. Method

We selected the countries which investigate; they were Japan and South Korea as Oriental area, and Finland as Western area. The reason for making Finland applicable to investigation is as

follows. Finland is located in a European vestibule leading to the outside. Therefore, Finland is in Asia and the symmetrical Europe culture, and the design is presenting the interim aspect

of east and west. Furthermore, we performed comparison with Europe. In order to investigate the characteristic of Asia, comparison with Finland was also performed.

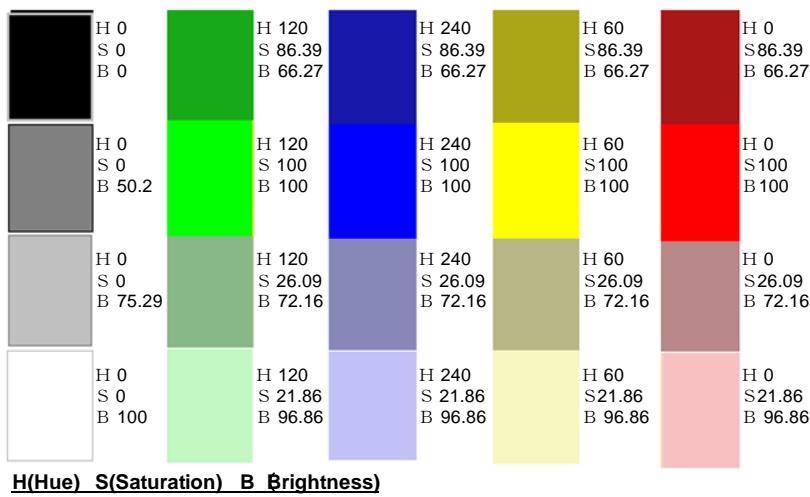
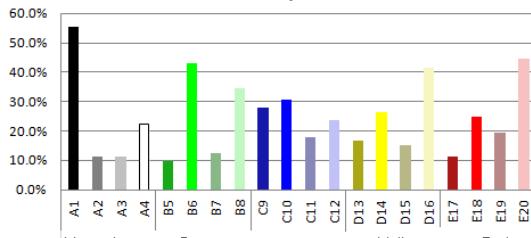
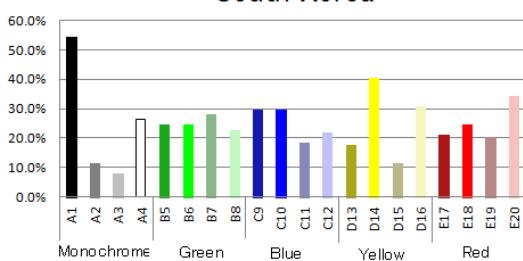


Fig. 1 The color used for investigation

Japan



South Korea



Finland

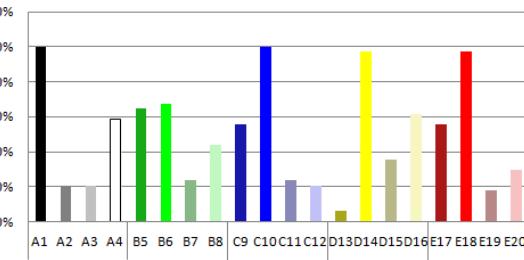


Fig. 2 Three nation comparison of color preference

1. Outline

Enforcement period: August, 2010 - October

Subject: 69 Finland, 117 South Korea, 61 Japan (All are college students).

2. Material

The color used for investigation was divided into five groups from which hue differs with monochrome, green, blue, yellow, and red. The brightness and chroma saturation of the base color were changed to four steps, respectively, and a total of 20 colors were set up.

3. Survey Content

In order to see the preference of brightness or chroma saturation, we made the subject choose a favorite color and a least favorite color within each group (monochrome, green, and blue, yellow, red). Moreover, we asked also the thing suitable as a color used for a product.

B. Results

As a result, a difference about the favorite color and the least favorite color in each country was hardly seen. However, it turned out that there is the difference about the color to use for a

product in east and west. Japan and South Korea showed the similar tendency so that a graph might show. Finland became a different tendency.

Although black was chosen overwhelmingly in Japan and South Korea, in Finland it was chosen not only black but also blue, yellow, and red. In Finland, the color from which brightness and chroma saturation changed was not chosen, but the base color was chosen.

These things showed that the difference of color preference in the east and west area appeared only in the color which should be used for a product.

III. SURVEY-2

It turned out that the color preference of a product differs in east and west area. It is guessed that this difference is produced from a culture factor and a geographical factor. Next, it investigated deeply about the geographical factor.

A. Method

About the country which investigated previous time, the latitude of Japan (Kyoto) and South Korea (Taegu) was 35 degrees north, and Finland (Helsinki) was 65 degrees north. We built up the hypothesis that the difference in this latitude influenced color preference.



latitude 39 CHINA:BEIJING JAPAN:AKITA
31 CHINA:SHANGHAI, Chengdu CHENGDU JAPAN:KAGOSHIMA

Fig. 3 Investigation city

In the East where culture is similar, the country and city where latitude differs were compared. The cities to investigate were Beijing and Akita of 39 degrees north, Shanghai, Chengdu and Kagoshima of 31 latitude. In the preliminary survey, the difference in a big color was looked at by wear dress in these cities.

and the least favorite color of a smart phone. We heard it also about the purchase factor. It was made to choose from a brand, a form, a price, a function, ease of use, and a color, and the importance of the color was investigated.

B. Results

A result is as follows. The difference was hardly seen about the favorite color of a smart phone in five cities. Although black was liked overwhelmingly, only Chengdu showed the weak tendency. The favorite color of the product showed the tendency for hue and brightness to be the same. However, not the color of a product but their own favorite colors differed in five cities. Blue and red were chosen except for Chengdu.

Logistic regression analysis was applied in order to clarify the factor affecting of a brightness difference. In the case of the brightness 0, a female factor influences minus ($p<.000$), and in 35 it turned out that Shanghai factor influences plus ($p<.032$). And in one more and 70, it turned out that Akita, Kagoshima, and a woman are working to plus ($p<.008$, $p<.029$, $p<.000$).

It indicated that a color as purchase factor is thought as important in South Korea and Finland. However, Japan was different.

1. Outline

- Enforcement period: November, 2011
- Subject: 100 Beijing Shanghai Chengdu, 104 Akita, 102 Kagoshima (Men and women aged from 20 to 50)
- Internet research

2. Material

By employing RGB model, brightness was adjusted and divided into three steps. The prepared color was all the 17 colors which added purple to black and white, red, blue, green, and yellow. The smart phone was selected as a product. Because everyone has the smart phone and a color variation is also abundant.

3. Survey Content

The contents of questions are selection about a favorite color

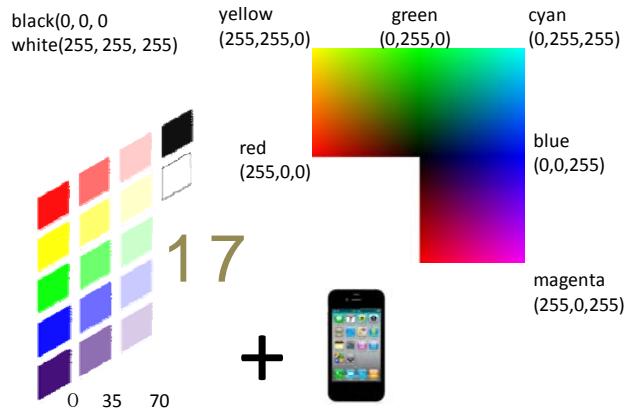


Fig. 4 The color used for investigation (2)

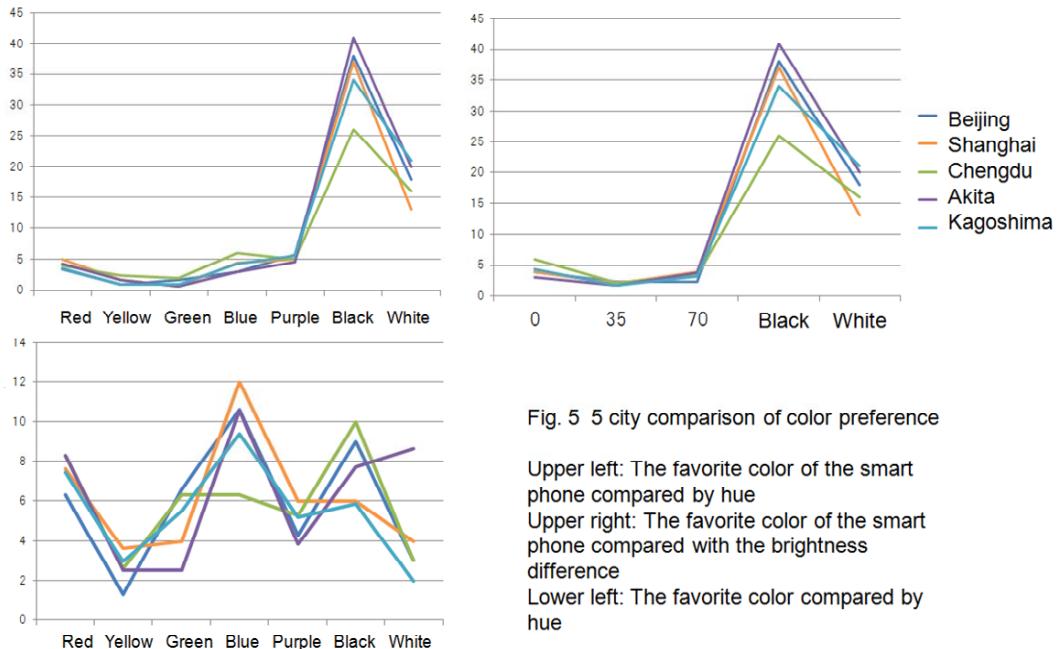


Fig. 5 5 city comparison of color preference. Upper left: The favorite color of the smart phone compared by hue; Upper right: The favorite color of the smart phone compared with the brightness difference; Lower left: The favorite color compared by hue

IV. DISCUSSION

We are having conducted this investigation and were able to derive some interesting knowledge. One is that color preference has a difference by east and west area. And it appears in color selection of a product. Although the Asian bloc likes black, Europe likes base colors, such as blue and red.

We tried to clarify the difference in color preference by latitude. But by this investigation, it was found that the color preference is hardly influenced by latitude. As a reason, it is possible that the latitudinal difference was too small. Furthermore, since the tendency only for Chengdu to be different was shown, it is necessary to also take into consideration the difference between an area along the shore and inland rather than latitude. It is also a future subject to clarify relation between a female factor and a brightness

difference.

As a result of this research useful information can be offered on the occasion of market entry.

Brightness	B	se	Wald	F	P	Exp (B)
0	Trend intention	-.023	.117	.038	1	.846 .977
	Color commitment	.132	.161	.667	1	.414 1.141
	Shanghai	-.200	.163	1.505	1	.220 .818
	Chengdu	-.169	.162	1.084	1	.298 .845
	Akita	-.274	.173	2.520	1	.112 .760
	Kagoshima	-.313	.173	3.267	1	.071 .731
	Woman	-.431	.106	16.430	1	.000 .650
	Constant	-1.303	.208	39.376	1	.000 .272
35	Trend intention	-.222	.147	2.287	1	.130 .801
	Color commitment	-.183	.187	.954	1	.329 .833
	Shanghai	.442	.206	4.595	1	.032 1.557
	Chengdu	-.050	.226	.049	1	.824 .951
	Akita	-.249	.237	1.098	1	.295 .780
	Kagoshima	.260	.216	1.444	1	.230 1.297
	Woman	.132	.133	.990	1	.320 1.142
	Constant	-2.049	.258	63.024	1	.000 .129
70	Trend intention	.282	.167	2.852	1	.091 1.326
	Color commitment	-.195	.215	.826	1	.363 .823
	Shanghai	.066	.266	.061	1	.805 1.068
	Chengdu	.399	.248	2.576	1	.108 1.490
	Akita	.676	.253	7.124	1	.008 1.965
	Kagoshima	.551	.253	4.756	1	.029 1.735
	Woman	.875	.159	30.485	1	.000 2.400
	Constant	-3.235	.314	106.024	1	.000 .039

Fig. 6 Factors affecting by the difference of brightness

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There is much international comparison research which makes especially East Asia and European countries applicable to investigation.