

## **Effects of Hair Colors on the Image**

- Centered on Female Collegians in Their 20s -

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### **Abstract**

In the modern society, already a popular and public part of fashion, hair coloring has the effect of optical illusion on image. This study therefor aims to reveal the effects of varied and fashionable hair coloring on the body images. This is a combination of an actual examination and an experimental study. In order to know the effects of hair colors on body image, 230 female collegians residing in Busan were given a questionnaire on the reality of hair dyeing. Based on the actual research, one subject was selected and stimuli were manufactured. The analysis and examination of the effects of hair dyeing have produced the following conclusions.

- (1) As a result of dispersion analysis about the image effect according to hair colors, a meaningful difference is recognized in the item and indicates that hair color variation influences the image effect.
- (2) As a result, extracting the factors that hair colors can influence the image, 3 factors were extracted. The first factor is an intellectual image, the second factor is an active image, and the third factor is a comfortable image.
- (3) Image effect in hair colors are as same next. Red and Orange color clearly indicate the image of 'charismatic', 'lively', 'positive', 'active', 'light' and 'gorgeous'. Blue and Green color indicates the image of 'unfriendly', 'hard', 'cold' and 'uneasy'. White color indicates the image of 'unfriendly', 'charismatic', 'gorgeous' and 'impure' then Black color has images of 'friendly', 'intellectual', 'indignified' and 'pure'. In other words, the result indicates rather a different tendency comparison with the general color image.

**Key words:** body image, hair coloring

### **I. Introduction**

Modern society fully enjoys economic wealth and modern people are endeavoring more efforts than ever for their own beauty. Owing to the rapid development of mass communications, people's desire for and pursuit of beauty have exploded to

lead to the development of fashion and beauty industries.

Diverse hair dyeing originating from top entertainers and models is right in fashion among the public, and most women dye their hair.<sup>1)2)3)</sup> Also, some stereotyped concepts of hair colors have gone way to colorful hair colors. Hair

dyeing, therefore, has become a genre of total fashion for the positive effects of one's unique expression along with clothes, hair styles, and makeup.<sup>4)5)</sup>

Hair styles are as much important as faces to determine first impressions and images. Changing hair styles is more economical than buying clothes, and the effect of optical illusion can easily change face types.<sup>8)</sup> So hair changes, like those by clothes, can be similarly great.<sup>9)</sup>

Out of human five senses, sight influences recognition by more than 70% and colors determine sight by above 70%. That's why hair dyeing effects on body types and images are expected to be significant.

Among the researchers on hair rinse and conditioning products are M. Wong,<sup>12)</sup> E. S. Abrutyn,<sup>13)</sup> M. F. Jurczyk, D. T. Floyd & B. H. Gruning,<sup>14)</sup> M. Westman,<sup>15)</sup> 古川利正,<sup>16)</sup> and 安間裕子.<sup>17)</sup> Hair types have been studied by Kim Sunheui,<sup>18)</sup> Kim Sujeong,<sup>19)</sup> Yi Wongyeong,<sup>20)</sup> Jeong Sukheui,<sup>21)</sup> Shin Heuisim,<sup>22)</sup> Oh Jimin & Oh Jiyeong,<sup>23)</sup> Oh Jiyeong,<sup>24)</sup> Bae Seonhyang,<sup>25)</sup> and Jeong Yeon.<sup>26)</sup> Hair dyeing likings and image changes have been reported by Choe Gwija,<sup>27)</sup> Na Yeongsun & Yu Hyeonju,<sup>28)</sup> and Yun Jiseong.<sup>29)</sup> In addition, papers on hair physiology related with dyeing are found in hygiene and medicine journals. But the effects of variously dyed hair colors on body types have rarely been researched.

This study, therefore, aims to reveal the effects of varied and fashionable hair coloring on images, focused on the influences of hair colors on body images.

## II. Research Methods & Procedures

### 1. Research Diagram

Based on the first literary research, second experimental research was held as shown in Fig. 1 below.

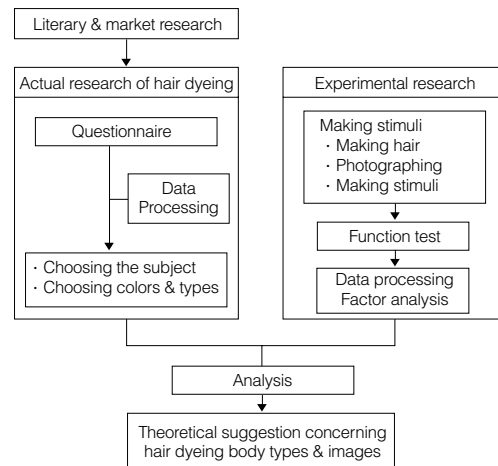
### 2. Actual Research of Hair Dyeing

#### 1) Subjects & Period

230 female collegians answered a questionnaire from September 1 through 6, 2003. Excluding 25 incomplete copies, 205 copies were used for final analysis.

#### 2) Contents

The questionnaire had 35 question items, and the final copy was completed after trust (0.78) verification.



<Fig. 1> Research diagram

### 3. Experimental Research

#### 1) Choosing the Subject

30 women collegians at Dong-A University in Busan, Korea were randomly chosen and one subject who had the closest records to national standards (1999/ division: females age 18~24) was selected after physical measurements.

#### 2) Making Stimuli

##### (1) Choosing Colors & Types

Based on the actual research of hair dyeing, six colors of hair (warm: red, orange; cold: blue, green; uncolored: white, black) most favored by women in their twenties were chosen. The type of hair was long hair with a curl, also their favorite.

##### (2) Making Hair

First, human hair samples were manufactured. On the basis of Gu Bonmi et al.,<sup>30)</sup> hair was decolored. Second, bestselling hair dyes in six chosen colors were applied to the bleached hair. Thus prepared samples were taken to a wig factory for the manufacturing of the wigs with the same pattern and length.

##### (3) Photographing

###### ① Costume & Posture of the Subject

The subject's costume was made of the material with some elasticity and the color similar to that of skin to prevent the interference of costume color. The face was applied basic makeup without coloring. The subject was made to stand with heels touching each other, front feet open at 30°. She wore the wigs of six colors by turns for the pictures in the front and the rear.

###### ② Photographing Materials & Conditions

The film used in this paper was Fuji chrome provia 100F (RDP II)<sup>31)</sup> D-type (daylight-type)

favored by professional photo artists,<sup>32)</sup> color reversal positive film<sup>36)</sup> with less printing errors<sup>34)35)</sup> compared with ordinary negative film.<sup>33)</sup> Film speed<sup>37)</sup> was ISO<sup>38)</sup> 100 to express natural and high-fidelity colors. The main lighting was daylight<sup>39)</sup> aided by flash cannon 540 EZ. As sunlight has conditions to express rich and exact colors around noon,<sup>40)</sup> 12~13:00 PM was chosen. Cannon-1N camera with the 85mm L lens was used for aberration correction.<sup>41)42)</sup> Based on the preceding research<sup>43)</sup> on coloring, light gray (N7: 342.4cm×158cm) was used as the background.

#### (4) Making Stimuli Materials

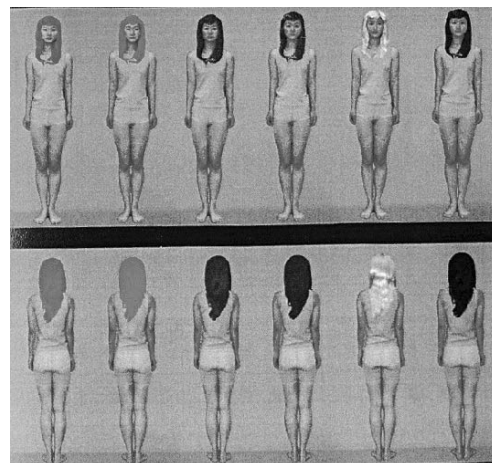
The photographed stimuli were processed as follows:

##### ① Development & Computer Film Scanning

After the slide film was developed, it was scanned on the computer in order to decrease color errors in the printing process.

##### ② Simulation

Grounded on the one-type hair pattern and posture, six colors of hair were prepared for color comparison in the same conditions. The



<Fig. 2> Stimuli materials

simulated colors were not varied on the computer but went through photographing and film scanning by the subject wearing six kinds of wigs.

③ Output

The little spots on the simulated photographs were removed by Photoshop 6.0 and the pictures were printed in the size of 8 × 10 inches.

④ Stimuli Manufactured

The stimuli were made when the front-rear photographs of the subject with six-colored wigs were placed on the black form boards (91.3 × 61.5cm).

3) Function Test

(1) Date & Testers

120 collegians in their 20s with normal sight (above 0.8 by corrected sight) took part from October 25 through 31, 2003.

(2) Test Items & Methods

Conferring prior reports,<sup>44)45)46)</sup> the researcher made 17 test items of human silhouette after validity examination. Evaluation was made in 5-stage measures. For fair evaluation, each item was fully explained to the testers and the order of colors was randomly made.

4) Data Processing

SPSS/win (ver 10.0) was utilized for data processing. 1) For actual hair research, frequency analysis (%) was done. 2) For the verification of body type optical illusion according to hair colors, dispersion analysis was made with Duncan test afterwards. 3) Factor analysis was held to reveal the factors of optical illusion with dispersion analysis for proof.

### III. Results & Discussion

#### 1. Dispersion Analysis: Results of Image making measurement

##### 1) Analysis of Image effects on hair color

The results that lead to dispersion analysis about the image analysis on hair colors are the same as <table 1>. According to this table, a meaningful difference is recognized in all the items, it indicates that variation of hair color can influence a human's image.

The tendency of Image variation on sorts of color is the same as < Fig 3>. Warm-color group, Red and Orange, indicates the image of 'youthful', 'fresh', 'dumb', 'positive', 'lively', 'charismatic', 'gorgeous', 'restless', 'active', 'light', 'undignified', 'passionate', 'soft', 'warm', 'impure', and the case of cold-color group, Blue and Green, indicates the images of 'unfriendly', 'youthful', 'fresh', 'dumb', 'positive', 'lively', 'charismatic', 'gorgeous', 'restless', 'active', 'light', 'undignified', 'passionate', 'hard', 'cold', 'uneasy', 'impure', so Red, Orange, Green and Blue color were extracted image terms totally in a large boundary, and it is considered that hair dyeing is effective for an image making. uncolored White, indicates the image of 'unfriendly', 'aged', 'charismatic', 'gorgeous', 'undignified', 'uneasy', 'impure', Black color indicates the image of 'friendly', 'intellectual', 'restless', 'ordinary', 'common', 'restless', 'comfortable', 'pure'. As comparing between these results and the general color theory, Green color indicates a 'fresh' image in general colors<sup>1)</sup>, by Eva Heller<sup>s2)</sup> research, resulted in the order of Green>Blue>Yellow>Orange but in the case of a hair color, it indicates in the order of

&lt;Table 1&gt; Results about dispersion analysis of the image on hair color

(N=120)

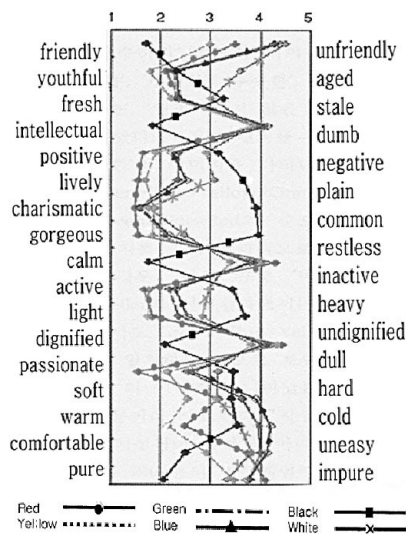
item	color	Red	Orange	Green	Blue	White	Black	F-value
intellectual—dumb		4.06 (b)	3.83 (b)	3.91 (b)	4.13 (a)	3.82 (b)	1.83 (c)	97.51***
friendly—unfriendly		3.45 (b)	2.97 (c)	4.27 (a)	4.37 (a)	4.49 (a)	3.170 (d)	144.94***
pure—impure		4.08 (a)	3.45 (c)	3.78 (b)	3.73 (b)	3.33 (c)	2.06 (d)	53.55***
calm—restless		4.28 (a)	3.98 (b)	3.86 (b)	3.78 (b)	3.38 (c)	1.75 (d)	80.92***
dignified—undignified		4.43 (a)	4.33 (b)	4.13 (c)	4.05 (d)	3.80 (d)	2.08 (e)	92.82***
charismatic—ordinary		1.47 (d)	1.88 (b)	1.55 (d)	1.60 (d)	1.76 (c)	3.91 (a)	133.91***
youthful—aged		2.10 (b)	1.78 (c)	2.25 (b)	2.31 (b)	3.58 (a)	2.32 (b)	46.39***
fresh—stale		2.36 (b)	2.20 (b)	2.31 (b)	2.35 (b)	2.99 (a)	3.25 (a)	19.40***
lively—plain		1.54 (d)	1.67 (d)	2.33 (c)	2.52 (c)	3.07 (b)	3.67 (a)	80.34***
positive—negative		1.63 (d)	1.90 (c)	2.21 (b)	2.36 (b)	2.92 (a)	3.15 (a)	42.13***
active—inactive		1.66 (d)	1.77 (d)	2.17 (c)	2.30 (c)	2.97 (b)	3.43 (a)	55.21***
light—heavy		1.83 (d)	1.73 (d)	2.35 (c)	2.53 (c)	2.83 (b)	3.68 (a)	59.85***
passionate—dull		1.53 (e)	2.13 (c)	2.55 (b)	2.64 (b)	3.15 (b)	3.44 (a)	51.72***
gorgeous—common		1.53 (e)	1.83 (b)	2.09 (c)	2.17 (c)	2.47 (b)	3.94 (a)	47.72***
warm—cold		2.48 (c)	2.13 (d)	3.95 (a)	4.20 (a)	3.59 (b)	3.53 (b)	75.80***
soft—hard		3.14 (c)	2.54 (d)	3.63 (b)	3.91 (a)	3.12 (c)	3.41 (b)	24.75***
comfortable—uneasy		3.72 (b)	2.91 (c)	3.98 (b)	4.13 (a)	3.81 (b)	2.50 (d)	47.72***

\*\*\*  $P \leq 0.001$ 

As a result of the Duncan verification, indicates different letters in the material group which revealed a meaningful difference(a>b>c>d>e)

Orange>Green>Blue>Red, it means that Orange color has the most effective image of 'fresh'. In the case of a 'youthful' image, Green and Yellow

color which symbolize 'youth' or 'immaturity', indicate Green>Yellow>White in Eva Heller's research and all of Green, Blue, Yellow, Orange



< Fig 3> Tendency of image variation on different colors

color can present a sense of youthful by hair color, that is, these results are parallel with the general theory. But White color presents in hair color an 'aged' image. It may be considered because White color associates the white hair. Also Blue color, symbolizing the 'intellectual color', has a 'dumb' image in hair color. Green and Blue color, contracting and cold colors, indicate an expansive colors' image, 'positive', 'lively', 'gorgeous', 'active' and 'light'. White color, the image of 'clean', 'comfortable', 'purity', indicates the image of 'gorgeous', 'indignified', 'impure', 'cold'; they aren't concerned with a natural image or an opposite image. Also Black color, symbolizing 'dignified', 'serious', indicates the image of 'friendly', 'comfortable', 'pure' in hair color.<sup>3)4)5)6)7)8)</sup>

That is, image variation has under hair colors contrary to the general color theory, and at the time of selecting hair color, hair color has great influence as much as clothes color, so people will

pay attention to select their hair color.<sup>9)</sup>

## 2) Formation Factor Indicating an Image Effect on Hair Color

### (1) Factor Analysis

In the results that are extracted the factors of image formation from Each color, 3 factors which has the Eigen value over 1 were extracted, the Eigen value. dispersion and total dispersion of extracted factors are the same as <table 2>, <table 3>.

The first factor has 5 groups of items, 'intellectual - dumb', 'friendly - unfriendly', 'pure - impure', 'calm - restless', 'dignified - indignified', this indicates an intellectual image. The first factor can reach the explanation ability of the Eigen value-7.0 and dispersion-41.47%.

The second factor has 9 groups of items, 'charismatic - ordinary', 'youthful - aged', 'fresh - stale', 'lively - plain', 'positive - negative', 'active - inactive', 'light - heavy', 'passionate - dull', 'gorgeous - common', all are indicating an active image. The second factor has 3.065 of the Eigen value and 18.028% of dispersion.

The third factor has 3 groups of items, 'warm - cold', 'soft - hard', 'comfortable - uneasy', these indicate a comfortable image. The third factor shows 1.358 of the Eigen value and 7.989% of dispersion.

### (2) Analysis of Factor Characteristics on Hair Colors

The result analyzing 6 factors characteristics by dispersion is the same as <table 4>. According to this table, the meaningful difference is recognized in all the items, they indicate that hair color can influence the characteristic of each item.

In an intellectual image, it can indicate in the

<Table 2> Result of Image Factor Analysis on Hair Color

(N=120)

item	Factor 1	Factor 2	Factor 3
intellectual—dumb	.823	-.161	-.020
friendly—unfriendly	.750	.055	.274
pure—impure	.746	-.123	.171
calm—restless	.717	-.387	-.082
dignified—indignified	.702	-.387	-.063
charismatic—ordinary	.661	.457	.025
youthful—aged	.285	.774	-.105
fresh—stale	-.038	.765	-.098
lively—plain	-.356	.757	.237
positive—negative	-.296	.743	.063
active—inactive	-.370	.712	.231
light—heavy	-.362	.709	.289
passionate—dull	-.315	.624	.273
gorgeous—common	-.551	.594	.160
warm—cold	.089	.186	.851
soft—hard	.111	.036	.846
comfortable—uneasy	.509	.051	.678
Specificity of Factor	Intellectual image	Active image	Comfortable image
Eigen Value	7.051	3.065	1.358
Dispersion(%)	41.475	18.028	7.989
Accumulation(%)	41.475	59.503	67.492

<Table 3> Items and Contents included Each Factor

Factor	Content of Factor	Content included Factor
1	Intellectual Image	intellectual, friendly, pure, calm, dignified, common
2	Active Image	youthful, fresh, lively, positive, active, light, passionate, gorgeous
3	Comfortable Image	warm, soft, comfortable

order of Red,Green,Blue>White,Orange>Black, Black is the effective hair color for making an intellectual image and the image of Black color makes 'friendly', 'intellectual', 'ordinary', 'common', 'restless', 'heavy', 'dignified', 'hard' and 'calm', finally, it could be a guide to efficiently make a intellectual image.

For an active image, it can indicate in the order

of Black>White>Blue>Green>Orange>Red, Orange and Red color to be effective for making active image, also the image of Orange and Red makes the image of 'youthful', 'fresh', 'positive', 'lively', 'charismatic', 'gorgeous', 'light' and 'passionate'.

In an comfortable image, it can indicate in the order of Blue>Green>White>Black>Red>

&lt;Table 4&gt; Result about Dispersion Analysis of Image Factor Characteristics on Hair Color

Factor \ item	Red		Orange		Green		Blue		White		Black		F-test
	M	S.D	M	S.D	M	S.D.	M	S.D.	M	S.D.	M	S.D.	
Intellectual Image	3.63 (a)	.50	3.41 (b)	.58	3.58 (a)	.54	3.61 (a)	.54	3.43 (b)	.63	2.22 (c)	.56	112.892***
Active Image	1.77 (d)	.53	1.87 (d)	.59	2.30 (c)	.78	2.38 (c)	.81	2.99 (b)	.82	3.36 (a)	.69	91.973***
Comfortable Image	3.13 (d)	.77	2.53 (e)	.75	3.85 (b)	.76	4.07 (a)	.73	3.50 (c)	.94	3.14 (d)	1.00	54.685***

\*\*\*  $P \leq 0.001$

As a result of the Duncan verification, indicates different letters in the material group which is made a meaningful difference (a>b>c>d>e)

Orange, Using Orange, Red and Black color is more effective for making a comfortable image and their image is made as 'friendly', 'comfortable', 'pure', 'warm', 'soft'.

#### IV. Conclusions

This is a combination of an actual examination and an experimental study. In order to know the effects of hair colors on body image, 230 female collegians residing in Busan were given a questionnaire on the reality of hair dyeing. Based on the actual research, one subject was selected and stimuli were manufactured. The analysis and examination of the effects hair dyeing on bodytypes have produced the following conclusion:

##### 1. Result of Image Making Measurement

(1) As a result of dispersion analysis about the image effect according to hair colors, a meaningful difference is recognized in all the items and it indicates that hair color variation influences the image effect.

(2) As a result, extracting the factors that hair colors can influence the image, 3 factors were extracted. The first factor is an intellectual image, the second factor is an active image, and the third factor is a comfortable image.

(3) Image effect on hair colors are as the same next. Red and Orange color clearly indicate the image of 'charismatic', 'lively', 'positive', 'active', 'light' and 'gorgeous'. Blue and Green color indicate the image of 'unfriendly', 'hard', 'cold' and 'uneasy'. White color indicates the image of 'unfriendly', 'charismatic', 'gorgeous' and 'impure', then Black color has images of 'friendly', 'intellectual', 'indignified' and 'pure'. In other words, the result indicates rather a different tendency comparison with the general color image.

Then, the results put together, hair dyeing is already generalized, popularized, and settled a part of fashion in today's world. Especially we could get the information that hair colors spread the clear effects of a image variation. In dyeing hair, it indicates a different result against a image of clothes colors, so a dyeing operator (beautician) has to check the customers' body type. Also, customers should be familiar with their



own body type, preferences, and then carefully select a reasonable color to dye the hair. The investigation data and theory about a body images optical illusion on hair color is too insufficient, that is what this study is expected to be a significant factor as a basic study tool on taking a theory of hair color researches. However, this study is limited as a subject, a hair style and a length were fixed just one type for minimizing the effects or variables to an optical illusion, so the results of this study cannot be generalized. In future, further studies we can show how hair colors influence on hair length, hair style and body shapes should be continued, more comprehensive and systematic theories should be followed regarding hair colors.

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