Evaluation of emotional images according to differences in post-processing of plastic cosmetics containers

Ji Eun Lee

School of Design, Ewha Womans University, South Korea
Email: smilelje@naver.com

Among the elements constituting the package designs, the completeness of color, material, and surface treatment finish (hereinafter referred to as CMF) is an important factor that determines the quality of the product and plays a major role in forming a brand image identity. This study was intended to examine emotional images according to colors and surface treatment finishes (post-processing) among cosmetics package design elements. Emotional image evaluation was carried out with a Likert scale using the extracted emotional adjectives for sample rendering, and those emotional images that appeared at high values by color and by post-processing were analyzed through the average values of individual evaluation results. As a result of the study, it was identified that emotional images appeared differently by color and by post-processing through emotion evaluation. The results of this study as such suggest that the emotional images of cosmetic containers may change according to changes in the color and post-processing.

Introduction

Recently, as interest in K-beauty has been increasing, the scale of the domestic cosmetics market has been growing. Accordingly, competition among cosmetics brands is intensifying naturally. If a certain image of a brand is consistently perceived by consumers, it can lead to lasting relationships and loyalty to the brand. Therefore, cosmetics brands exhibit their discrimination from other brands with product package designs that fit their brand image in order to establish their identity.

Cosmetics package designs play a role in maintaining the characteristics of a product by delivering information, attributes, and contents of the product to consumers through visual elements [1]. Cosmetics package designs consist of elements such as the brand logo, design layout, shape, material, and color. Among such elements, the completeness of color, material, and surface treatment finishing (CMF) is an important factor that determines the quality of the product and plays a major role in forming a brand image identity. It is also one of important elements to satisfy the emotions of consumers [2].

Therefore, in this study, those package design elements that can lead to the cosmetics brand identity will be analyzed through the emotional images according to the colors and surface treatment finishes (post-processing) among the cosmetics package design elements in order prepare objective standards for enhancing brand competitiveness.

Method

Stimulus selection

First, in view of the fact that the customer base of the cosmetics market is being diversified, a market survey was conducted targeting domestic mid-to low-priced brands that can be easily accessed to select the shapes and types of basic cosmetics containers that are mainly used for products. A total of nine brands were surveyed, which are Laneige, Mamonde, Innisfree, Etude, The Face Shop, Missha, Tony Moly, It's Skin, and Nature Republic, and cream products in the best-selling basic lines with the highest sales in each brand were mainly surveyed.

According to the results of the survey, the shape of containers most extensively used for cream products was the jar shape, and pp plastic was mainly used as the material. Thereafter, the range of colors (R, YR, YG, G, BG, PB, N9.5, translucent) and the tones(bright) used frequently in the products of the nine brands were extracted using the IRI Hue&Tone System. Those surface treatment finishes (post-processing) that were frequently used by the nine brands were glossy general injection that did not undergo any post-processing, matt coating, which has a matt finish, and glossy/matte silver vapor deposition that gives a feeling of metal.

Consequently, a total of 48 sample ranges (Table 1) were selected by combining the colors and surface treatment finish (post-processing) elements extracted through the market survey, and the final sample images were made by substituting the foregoing into pp(plastic) jar-type cream containers through 3D rendering (Figure 1).

finish (post-processing)	container cap	container body	color
case 1	general injection (glossy)	general injection (glossy)	
case 2	matt coating	matt coating	R, YR, GY, G, BG, PB, N9.5, translucent (cases 3-6 are only for container body)
case 3	glossy silver vapor deposition	general injection (glossy)	
case 4	glossy silver vapor deposition	matt coating	
case 5	matt silver vapor deposition	general injection (glossy)	
case 6	matt silver vapor deposition	matt coating	
Total number of samples	48		

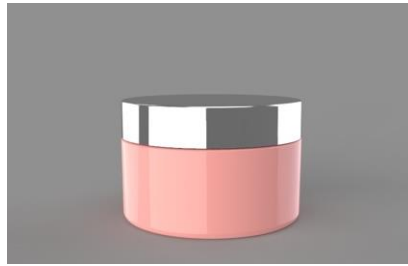Table 1: Table of combinations of colors and post-processing elements for sample images.

Figure 1: Rendered sample image.

Extraction of emotional adjectives

In the case of emotional vocabularies, since there are many previous studies conducted in South Korea, the vocabularies finally presented in previous studies were collected rather than directly extracting emotional vocabularies. Referring to previous studies on emotional images of product designs and cosmetics packages [3-5], 16 emotional adjectives (luxurious, clean, transparent, splendid, elegant, simple, natural, rough, smooth, moist, soft, light, feminine, refined, mysterious, and medicinal) that appeared frequently in relation to the shape, color, and material qualities were extracted. Thereafter, color design experts excluded adjectives with the same meanings and finally extracted six emotional adjectives (clean, elegant, natural, moist, soft, refined). In addition, 'preferred' was added in order to investigate changes in preference according to emotional images. Therefore, a total of seven adjectives were selected.

Emotional images evaluation

Emotional images of the 48 rendered images were evaluated using the finally extracted adjectives. A total of 40 men and women in their 20s to 40s participated in this evaluation questionnaire survey. The participants evaluated the degrees of images felt by them on a 7-point Likert scale using the seven emotional adjectives presented for 48 cosmetics container images. The evaluation method was composed so that answers would be selected from the Likert 7-point scale, ranging from 1 (not at all) to 7 (strongly agree). The evaluation questionnaire survey was carried out through mobile using the Google online questionnaire, and the participants were asked to evaluate the images with the mobile phone set to 100% brightness and the horizontal screen.

Results

In this study, to examine which emotional images show high scores for the colors and post-processing of cosmetic packages, the average values of the evaluation results were derived and arranged in a table (Figures 2 and 3).

Results according to color changes

The results of evaluation of emotional images according to colors are as shown in Figure 2. In the case of R and YR, the 'soft' image showed high scores, in the case of GY and G, the 'natural' image showed high scores, in the case of BG and PB, the 'moist' image showed high scores, and in the case of achromatic color N9.5(Wh) and translucent color, the 'clear' image showed high scores. In the case of relatively similar series of colors located closely in the hue circle, the same emotional image adjectives showed high scores.

R

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	4.85	4.45	4.95	**5.00**	4.73	4.70	4.78
clear	4.58	4.23	4.65	4.50	4.43	4.35	4.45
natural	3.28	3.73	3.55	3.65	3.40	3.50	3.52
moist	4.80	3.78	4.88	4.33	4.45	3.98	4.37
soft	**5.68**	**4.68**	4.68	4.70	**5.00**	**4.83**	**4.93**
refined	5.03	4.40	**5.15**	4.83	4.63	4.65	4.78
preferred	4.80	4.13	4.40	4.45	4.30	4.30	4.40

BG

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	4.08	3.53	4.25	4.05	4.15	4.13	4.03
clear	4.63	4.13	4.68	**4.50**	4.40	4.45	4.46
natural	4.43	4.13	4.05	4.40	4.23	4.38	4.27
moist	**5.25**	4.08	**5.23**	4.40	**5.08**	4.50	**4.75**
soft	4.48	**4.25**	4.20	4.28	4.53	**4.53**	4.38
refined	4.03	3.90	4.40	4.15	4.20	4.25	4.15
preferred	4.13	3.63	4.18	4.00	4.03	4.18	4.02

YR

	case 1	case 2	case 3	case 4	case 5	case 6	mean
우아한	3.95	3.70	**4.88**	4.53	4.35	4.13	4.25
깨끗한	3.95	4.10	4.35	4.15	3.95	3.93	4.07
자연적인	3.85	4.03	3.83	3.65	3.85	3.50	3.78
촉촉한	4.25	3.63	4.53	3.90	3.90	3.28	3.91
부드러운	**4.50**	**4.80**	4.78	**4.70**	4.48	**5.00**	**4.71**
세련된	3.80	3.80	4.28	4.20	3.88	4.23	4.03
선호하는	3.93	3.70	4.15	3.73	3.55	3.55	3.77

PB

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	4.43	4.40	5.05	4.18	4.65	4.83	4.59
clear	5.13	4.98	5.40	5.30	4.90	**4.95**	5.11
natural	4.28	4.18	4.53	4.10	4.48	4.48	4.34
moist	5.45	4.93	**5.63**	**5.33**	**5.23**	4.63	**5.20**
soft	5.05	**5.28**	5.15	4.83	4.90	4.88	5.01
refined	4.70	4.70	5.13	5.08	4.78	4.80	4.86
preferred	4.80	4.73	5.05	5.25	4.83	4.85	4.92

GY

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	3.30	3.18	3.53	3.55	3.30	3.30	3.36
clear	4.10	4.10	4.05	**4.43**	3.58	3.93	4.03
natural	5.10	**4.48**	4.28	**4.43**	4.40	**4.35**	**4.50**
moist	4.70	3.70	**4.78**	4.20	4.28	3.70	4.23
soft	4.33	4.18	4.08	4.13	3.95	3.90	4.09
refined	3.53	3.75	3.50	3.88	3.13	3.43	3.53
preferred	3.48	3.75	3.40	3.33	-3.23	3.28	2.33

N9.5

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	5.08	5.05	5.45	5.40	5.13	5.20	5.22
clear	**6.23**	**6.10**	**5.80**	**5.88**	**5.60**	**5.75**	**5.89**
natural	4.73	4.83	4.50	4.13	4.50	4.43	4.52
moist	5.45	4.68	5.65	5.00	5.05	4.48	5.05
soft	5.28	5.35	5.45	5.13	5.30	5.15	5.28
refined	5.20	5.00	5.60	5.18	5.18	5.00	5.19
preferred	5.38	5.18	5.53	5.38	5.08	4.85	5.23

G

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	3.05	3.50	4.18	3.90	3.35	3.80	3.63
clear	3.98	4.20	4.73	4.15	3.88	4.03	4.16
natural	**4.90**	**4.80**	4.85	**4.50**	4.28	**4.53**	**4.64**
moist	**4.90**	4.00	**5.25**	4.30	4.13	3.88	4.41
soft	4.28	4.48	4.43	4.25	4.03	4.25	4.28
refined	3.28	3.70	4.25	3.85	3.60	3.78	3.74
preferred	3.53	3.80	4.33	3.58	3.40	3.53	3.69

translucent

	case 1	case 2	case 3	case 4	case 5	case 6	mean
elegant	2.98	2.63	3.88	**4.43**	3.98	4.85	3.79
clear	4.03	3.30	3.83	3.95	3.93	4.48	**3.92**
natural	2.73	2.48	2.83	2.88	2.80	2.80	2.75
moist	3.40	2.88	3.98	3.80	3.90	3.58	3.59
soft	3.23	3.05	3.55	3.75	3.60	3.80	3.50
refined	2.98	2.83	**4.00**	4.28	**4.20**	**5.00**	3.88
preferred	3.20	2.63	3.98	4.05	3.83	4.50	3.70

Figure 2: Table of analysis of average values of emotional images according to color changes.

Results according to changes in post-processing

The results of evaluation of emotional images according to changes in the post-processing are as shown in Figure 3. In the case of the combination of general injections(glossy/glossy), the combination of glossy silver vapor deposition-general injection(silver glossy/glossy), and the combination of matt silver vapor deposition-general injection(silver matt/glossy), the 'moist' image showed high scores, in the case of the combination of matt coatings(matt/matt) and the combination of matt silver vapor deposition-matt coating(silver matt/matt), the 'soft' image showed high scores, and in the case of the combination of glossy silver vapor deposition-matt coating(silver glossy/matt), the 'clean' image showed high scores.

case 1

	R	YR	GY	G	BG	PB	N9.5	traslucent	mean
elegant	4.85	3.95	3.30	3.05	4.08	4.43	5.08	2.98	3.96
clear	4.58	3.95	4.10	3.98	4.63	5.13	6.23	4.03	4.58
natural	3.28	3.85	5.10	4.90	4.43	4.28	4.73	2.73	4.16
moist	4.80	4.25	4.90	4.90	5.25	5.45	5.45	3.40	**4.78**
soft	5.68	4.50	4.33	4.28	4.48	5.05	5.28	3.23	4.60
refined	5.03	3.80	3.53	3.28	4.03	4.70	5.20	2.98	4.07
preferred	4.80	3.93	3.48	3.53	4.13	4.80	5.38	3.20	4.15

case 4

	R	YR	GY	G	BG	PB	N9.5	traslucent	mean
elegant	**5.00**	4.53	3.55	3.90	4.05	4.18	5.40	**4.43**	4.38
clear	4.50	4.15	**4.43**	4.15	**4.50**	5.30	**5.88**	3.95	**4.61**
natural	3.65	3.65	**4.43**	4.50	4.40	4.10	4.13	2.88	3.97
moist	4.33	3.90	4.20	4.30	4.40	**5.33**	5.00	3.75	4.41
soft	4.70	**4.70**	4.13	4.25	4.28	4.83	5.13	3.75	4.47
refined	4.83	4.20	3.88	3.85	4.15	5.08	5.18	4.28	4.43
preferred	4.45	3.73	3.33	3.58	4.00	5.25	5.38	4.05	4.22

case 2

	R	YR	GY	G	BG	PB	N9.5	traslucent	mean
elegant	4.45	3.70	3.18	3.50	3.53	4.40	5.05	2.63	3.80
clear	4.23	4.10	4.10	4.20	4.13	4.98	**6.10**	**3.30**	4.39
natural	3.73	4.03	**4.48**	**4.80**	4.13	4.18	4.83	2.48	4.08
moist	3.78	3.63	3.70	4.00	4.08	4.93	4.68	2.88	3.96
soft	4.68	**4.80**	4.18	4.48	**4.25**	5.28	5.35	3.05	**4.51**
refined	4.40	3.80	3.75	3.70	3.90	4.70	5.00	2.83	4.01
preferred	4.13	3.70	3.75	3.80	3.63	4.73	5.18	2.63	3.94

case 5

	R	YR	GY	G	BG	PB	N9.5	traslucent	mean
elegant	4.73	4.35	3.30	3.35	4.15	4.65	5.13	3.98	4.20
clear	4.43	3.95	3.58	3.88	4.40	4.90	**5.60**	3.93	4.33
natural	3.40	3.85	**4.40**	4.28	4.23	4.48	4.50	2.80	3.99
moist	4.45	3.90	4.28	4.13	**5.08**	**5.23**	5.05	3.90	**4.50**
soft	**5.00**	4.48	3.95	4.03	4.53	4.90	5.30	3.60	4.47
refined	4.63	3.88	3.13	3.60	4.20	4.78	5.18	**4.20**	4.20
preferred	4.30	3.55	-3.23	3.40	4.03	4.83	5.08	3.83	3.22

case 3

	R	YR	GY	G	BG	PB	N9.5	traslucent	mean
elegant	4.95	**4.88**	3.53	4.18	4.25	5.05	5.45	3.88	4.52
clear	4.65	4.35	4.05	4.73	4.68	5.40	**5.80**	3.83	4.68
natural	3.55	3.83	4.28	4.85	4.05	4.53	4.50	2.83	4.05
moist	4.88	4.53	**4.78**	**5.25**	**5.23**	**5.63**	5.65	3.98	**4.99**
soft	4.68	4.78	4.08	4.43	4.20	5.15	5.45	3.55	4.54
refined	**5.15**	4.28	3.50	4.25	4.40	5.13	5.60	**4.00**	4.54
preferred	4.40	4.15	3.40	4.33	4.18	5.05	5.53	3.98	4.38

case 6

	R	YR	GY	G	BG	PB	N9.5	traslucent	mean
elegant	4.70	4.13	3.30	3.80	4.13	4.83	5.20	4.85	4.37
clear	4.35	3.93	3.93	4.03	4.45	**4.95**	**5.75**	4.48	4.48
natural	3.50	3.50	**4.35**	**4.53**	4.38	4.48	4.43	2.80	3.99
moist	3.98	3.28	3.70	3.88	4.50	4.63	4.48	3.58	4.00
soft	4.83	**5.00**	3.90	4.25	**4.53**	4.88	5.15	3.80	**4.54**
refined	4.65	4.23	3.43	3.78	4.25	4.80	5.00	**5.00**	4.39
preferred	4.30	3.55	3.28	3.53	4.18	4.85	4.85	4.50	4.13

Figure 3: Table of analysis of average values of emotional images according to changes in post-processing.

Discussion and conclusions

This study examined emotional images according to colors and surface treatment finishes (post-processing) among cosmetics package design elements to develop effective package designs that fit brand identities.

Those colors and post-processing elements that are the most extensively used in the domestic market were derived to make 48 cosmetic sample images. Thereafter, referring to previous studies on emotional vocabularies regarding product designs and cosmetics package elements, seven emotional adjectives were extracted. Finally, emotional images were evaluated to examine emotional adjectives for 48 sample images, and the results according to colors and surface treatment finishes (post-processing) were arranged.

The results of the study are as follows. First, emotions according to colors were evaluated and according to the results, in the case of R and YR, the 'soft' image showed high scores, in the case of GY and G, the 'natural' image showed high scores, in the case of BG and PB, the 'moist' image showed high scores, and in the case of achromatic color N9.5(Wh) and translucent color, the 'clear' image showed high scores. The results as such can be interpreted as indicating that relatively similar colors located in the same series in the hue circle can have similar emotional images.

Next, in the results of evaluation of emotions according to the combinations of post-processing, in the case of the combination of general injections (glossy/glossy), the combination of glossy silver vapor deposition-general injection(silver glossy/glossy), and the combination of matt silver vapor deposition-general injection(silver matt/glossy), the 'moist' image showed high scores, in the case of the combination of matt coatings(matt/matt) and the combination of matt silver vapor deposition-matt coating(silver matt/matt), the 'soft' image showed high scores, and in the case of the combination of glossy silver vapor deposition-matt coating(silver glossy/matt), the 'clean' image showed high scores.

Through the evaluation of emotions, it could be seen that emotional images appeared differently by color and by post-processing, and such results suggest that the emotional images of cosmetics containers may vary according to changes in the color and post-processing. In addition, it was found that there are conditions for those combinations of colors and post-processing that can maximize certain emotional images. For example, it is thought that when a 'soft' image is desired to be shown, the relevant emotional image can be more effectively shown by expressing the package container with bright R and YR series colors and designing the finish (post-processing) as a combination of matte coatings (matte/matte). Lastly, it could be seen that the preference increased when the emotional image strongly felt from the sample image was being moist and clean. It is thought that if products representing a brand is developed through the data as such, post-processing elements that have the emotional image that coincide with the brand image can be applied to products to show the brand image more strongly.

In this study, since the participants were asked to evaluate emotional images only according to changes in color and post-processing elements while the shapes of the containers were set identically, the results of this study can be said to have appeared according to changes in the color and post-processing. However, this study is meaningful in that it mainly examined the emotional images of colors and post-processing among product package elements unlike the existing studies on emotional vocabularies related to domestic cosmetic brand images and products. In addition, it is expected that this data will be helpful in preparing objective standards by verbalizing subjective emotions about packages.

References

1. Gu HY and Kim MK (2010), The package design strategy for a brand image reinforcement of raw rice wine, *A Journal of Brand Design Association of Korea*, **8** (1), 5-21.

2. Lee NJ (2014), The research of the user emotional actions on the product CMF (Color/Material/Finishing): focusing on the robot design for single households, *Masters Dissertation*, Ewha Womans University.

3. Chae JS, Jang YS and Kim HB (2016), Extracting representative emotional words for analyzing preference factors in product design: focused on shape, color and texture, *Journal of Industrial Design Studies*, **10** (4), 31-38.

4. Lee MJ, Rhie JM, Jang YS and Jang MJ (2012), Preference of moisturizing cosmetics' container design image - with a focus on sensitivity adjective image language, *Archives of Design Research*, **25** (1), 125-134.

5. Kim CJ and Park JS (2015), Consumer's emotional responses to cosmetic packaging design, *A Journal of Brand Design Association of Korea*, **13** (2), 79-90.