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Effects of Colored Filters on Thai's Skin Tones

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ABSTRACT

This study aims to investigate the influence of colored filters on changes of Thais' skin tones and healthy skin perception when the colored filters were used in the photography. The photographs were taken in a studio, using 5500 K daylight lamp and under colored filters. The colored filters consisted of peach, pink, orange, yellow, green, and blue in front of the studio light. Three different skin tone models, including light brown, moderate brown, and dark brown were participated. No coloring cosmetics were used on the models' skin in order not to alter their original skin tones. The controlled variables were lens types, apertures, image sizes, a space between the models and background, and the light temperatures. Thirty students in the field of photography from Rajamangala University of Technology Thanyaburi (RMUTT) were asked to conduct the psychophysical experiment as the subjects. The study has found that the skin tones changed differently according to filter colors used in the photography. Warm color filters tended to create a dull effect on the skin. Orange filter helped the models' skin looked rosy the most. In addition, colored filter did not have a significant effect on the smoothness of the skin.

Keywords: cosmetic filter, colored filter, skin tone, Thai skin tone, photography

1. INTRODUCTION

Nowadays, the cosmetic market is growing rapidly. In Thailand, the cosmetic market continually expands year on year because people are concerned about their health and focused on how to make themselves look good despite the economic situations[1]. It is said that cosmetic products have become one of the basic human needs. It has predicted that ASEAN cosmetic market would have risen from 130 billion baht to 140 billion baht when the ASEAN community is initiated. Products from Thailand hold a 40-percent market share[2]. This issue, hence, is one of the Thai government's policies: to push Thailand becoming the center of cosmetic manufacturing and expecting Thailand, in the future, has an opportunity to be the cosmetic manufacturing base.

One of the important factors to draw customers' attention is how to make photography for the cosmetic advertisements attractive through commercials, advertisement posters, online media, or the Internet[3]. In the cosmetic marketing, an advertisement is required to catch a customer's attention and give said customer a good feeling—beauty and good health. So, the colored filters which is a lighting techniques in the photography is used to make products more attractive. Skin tones of the cosmetic models play an important role to express beautiful and healthy. The beautiful and healthy skin tone should be radiant, rosy, and smooth[4].

However, sometimes models might not always possess beautiful or healthy skin tone, but it can be fixed by using cosmetic filters or colored filters[5] to add diffusion to the studio light and help the models skin look healthier. People have different skin tones; therefore, this study aims to investigate in the effects of colored filters on Thai's skin tones.

2. MATERIALS AND METHOD

Six colored filters including peach, pink, orange, yellow, green, and blue were used in the experiment. There were three different models that possessed light brown, moderate brown, and dark brown skin tone without coloring cosmetic on models' skin in order to maintain their original skin tones. The photographs were taken in a studio, using a DSLR camera with AF 50 mm. f1/8 lens. The color temperature of the two lamps was 5500 K. The close-up shots were taken with the main light in front of and fill light on the side of the models. The photographs were taken with no-filter shot and other six colored filters placed in front of the main light. Each model was taken seven photographs per skin tone. The controlled variables were lens type, aperture, image size, space between the models and background, and the light temperature.

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The questionnaire was used to collect data; questions were divided into two parts: the skin tone perception after using the colored filters and the perception of healthy skin with colored filters in the photography. The first question was which color matched the models' skin tone the most. Then the participants were asked to choose the best match to the Munsell color chip. Nine Munsell color chips were applied to this task consisting of 7.5YR7/6, 5YR7/6, 2.5YR7/6, 7.5YR6/6, 5YR6/6, 2.5YR6/6, 7.5YR6/8, 5YR6/8, and 2.5YR 6/8. All color chips were horizontally placed on a moderate gray paper to have the participants matching the color chips with each model's skin tones with and without colored filters. The second question was how the models' skin looked (dull, radiant, pale, rosy, rough or smooth). The semantic differentials method was conducted in this experiment.

Thirty students in the field of photography of RMUTT were asked to participate in the experiment. The experimental room's light was controlled to illuminate 500 lux, which was the standard office illuminance according to Chartered Institution of Building Service Engineering (CIBSE) [6]. The digital photographs were shown on a screen that has previously calibrated by the X-Rite i1Basic Pro2 for the perceptual accuracy. The space between the monitor and the participants was 60 centimeters. The experiment was that, firstly, the subjects had to look at one photo at a time and picked the matched color chip from the Munsell Book of Color without time limitation. The photos were shown randomly in each group of skin tones. Each photo was disappeared and replaced by gray background in order to have the participants be prepared for the next photo. After that, the subjects were asked to relax their eyes for fifteen minutes before continuing the second part. Secondly, for the perception of healthy skin with the colored filter used in the photography; there was no time limitation for the answer. The pictures were randomly shown in each skin tone group. After the first group of skin colors, the participants were asked to relax their eyes for another fifteen minutes before doing the experiment on the next group.

To analyze the collected data about the perception of skin tones, Munsell color codes were converted into L*a*b* value and the result in mode. To analyze the perception of healthy skin, the median are applied with established criteria as follows; 1-2 points = dull/rough/pale, 3-4 points = fairly radiant/fairly smooth/fairly rosy, and 5-6 points = radiant/smooth/rosy.
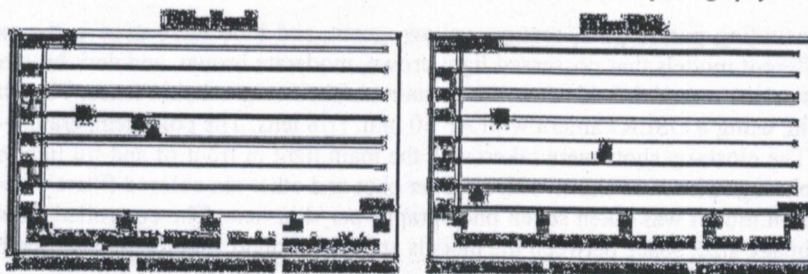
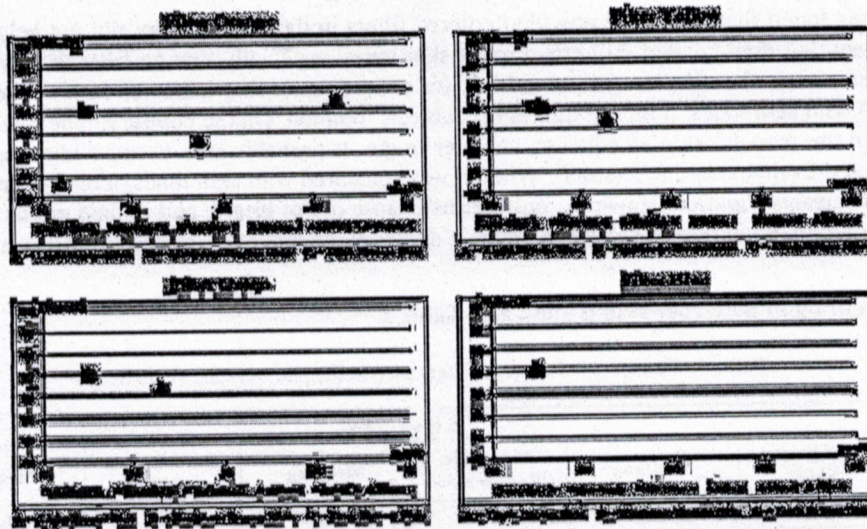**Figure 1.** Picture used in the study
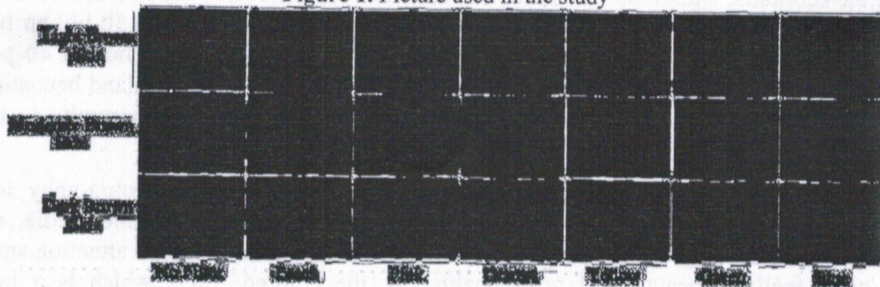
3. RESULTS AND DISCUSSION

3.1. The perception of skin tone with colored filters used in photography.

The study has found the perception of skin tones with colored filters used in photography as shown in Figure 2.

Figure 2. The perception of skin tone with colored filters used in photography

The skin tone perception with the colored filters in the photography's results, after converted Munsell's color code to L*a*b*, were shown in the Figure 2. The study has found that almost of the subjects perceived three skin tones with no colored filters as reddish yellow and the mode value was L*72.2 a*17.5 b*35.6. The subjects perceived light brown and moderate brown skin tone with peach filter as reddish yellow with the increasing of redness and the mode value was L* 72.4 a* 21.5 b* 32.3 while the dark brown skin tone was seen as L*63.6 a* 20.7 b*33.9. As for the pink filter, both light brown and moderate brown skin tones were perceived as reddish yellow with the increasing of redness and the mode value was L*72.4 a*16.1 b*18.3 while the dark brown skin tone was perceived as L*62.3 a*23.7 b*28.2. The participants had different views on the three skin tones in the orange filter. The light brown skin tone was seen as reddish yellow with the increasing of redness and the mode value was L*72.4 a*16.1 b*18.3. The moderate brown was seen at L*62.3 a*23.7 b*28.2 while the dark brown was perceived at L*63.0 a*31.2 b*37.6. The subjects viewed yellow filters on the light brown skin tone as reddish yellow with the increasing of redness and the mode value was L*72.7 a*17.5 and b*35.6 while the moderate brown skin tone was seen as L*72.4 a*21.2 b*32.3, and the dark brown skin tone was seen as L*62.9 a*18.1 b*35.2. In the green filter, the light brown was seen as reddish yellow with the increasing of redness and the mode value was L*72.7 a*17.5 b*35.6 while the moderate and dark brown were perceived as L*72.4 a*21.5 b*32.3. The subjects perceived all three skin tones in the blue filter as L*72.7 a*17.5 b* 35.6. The reason that the skin tones were perceived as reddish yellow was the red combination in the color filter. It might be because the qualification of filter that allowed its own color to transmit through it and blocked the other differently at the same time[7]. Therefore, it allowed red to go through and blocked the different color such as blue and green[8]. As a result, the photos tended to look redder. The same reason occurred with blue filter was that it did not allow the red color to go through itself. Therefore, the models' skin tones did not look redder.

3.2. The perception of healthy skin with cosmetic used in the photography

The study has found the perception of healthy skin with cosmetic used in the photography as shown in the following tables.

3.2.1. The perception of dull/radiant skin is shown in Table 1

Table 1. The scores of colored filters used in the photography (Dull/Radiant)

Cosmetic Filter	x̄ (Dull/Radiant)					
	Light Brown Skin	Meaning	Moderate Brown Skin	Meaning	Dark Brown Skin	Meaning
No Filter	5.12	radiant	4.63	radiant	4.29	fairly radiant
Peach	4.01	fairly radiant	3.03	fairly radiant	2.32	dull
Pink	3.67	fairly radiant	2.5	fairly radiant	2.36	dull
Orange	3.08	fairly radiant	2.37	dull	2.06	dull
Yellow	3.64	fairly radiant	3.22	fairly radiant	3.34	fairly radiant
Green	4.37	fairly radiant	3.39	fairly radiant	3.76	fairly radiant
Blue	4.59	radiant	3.92	fairly radiant	3.8	fairly radiant

The study has found that, using six provided colored filters in the photography did not help all skin tones look radiant, but they created dull effect to all skin tones, especially orange filter. It was because using orange filter made the skin looked red, which was a warm color that indicated heat[9]. When it was being compared with skin tones, it looked dull in the subjects' opinion. On the contrary, blue filter created radiant effect on the models' skin as equal as no filter usage. It probably was because blue was a cool color that indicated freshness and relaxation[9]. When it was compared with skin tones, it did not create dull effect in the participants' opinion. However, dull means intense or not bright, and radiant means bright[10]. In the photography, under exposure value can create a darker photo and over exposure value can create a bright photo[11].

3.2.2. The perception of pale/rosy skin is shown in Table 2

Table 2. The scores of colored filters used in the photography (Pale/Rosy)

| Cosmetic Filter | $\bar{x}$ (Pale/Rosy) | | | | | |
	Light Brown Skin	Meaning	Moderate Brown Skin	Meaning	Dark Brown Skin	Meaning
No Filter	2.22	Pale	2.44	Pale	3.07	fairly rosy
Peach	3.89	fairly rosy	3.71	fairly rosy	3.81	fairly rosy
Pink	3.99	fairly rosy	4.08	fairly rosy	4.04	fairly rosy
Orange	4.32	fairly rosy	4.62	Rosy	4.23	fairly rosy
Yellow	3.6	fairly rosy	3.44	fairly rosy	3.61	fairly rosy
Green	3.59	fairly rosy	3.48	fairly rosy	3.62	fairly rosy
Blue	3.06	fairly rosy	3.21	fairly rosy	3.66	fairly rosy

The study has found that using six provided colored filters helped the models' skin tones looked rosy, especially orange filter. It might be because the interpretation of 'rosy' in the participants' opinion meant 'pinkish skin'[12]. Pink is created with proportions of red and white or red tone color. Orange filter has a tint of red that helps the skin to look redder; therefore, the used filter in the photography is interpreted as rosy skin tone.

3.2.3. The perception of rough/smooth skin is shown in Table 3

Table 3. The scores of colored filters used in the photography (Rough/Smooth)

| Cosmetic Filter | $\bar{x}$ (Rough/ Smooth) | | | | | |
	Light Brown Skin	Meaning	Moderate Brown Skin	Meaning	Dark Brown Skin	Meaning
No Filter	4.11	fairly smooth	3.89	fairly smooth	4.12	fairly smooth
Peach	4.19	fairly smooth	3.38	fairly smooth	3.66	fairly smooth
Pink	4.02	fairly smooth	3.42	fairly smooth	3.74	fairly smooth
Orange	3.77	fairly smooth	3.32	fairly smooth	3.76	fairly smooth
Yellow	3.93	fairly smooth	3.56	fairly smooth	4.03	fairly smooth
Green	4.48	fairly smooth	3.53	fairly smooth	4.08	fairly smooth
Blue	4.23	fairly smooth	3.72	fairly smooth	3.91	fairly smooth

The study has found that, six colored filters did not provide a rough or smooth effect on the skin. It might be because, in the experiment, the colored filter changed the color of light that did not affect the skin surface. The quality of light is necessary in the photography. Hard light is suitable for showing roughness of the subject surface, while soft light is suitable for creating a smooth effect on the subject surface[13].

4. CONCLUSION

1. The perception of the skin tone changed according to the color of the filters. Changes were varied to the intensity of the filters.
2. The warm colored filters created dull effect on the skin. If more radiant effect was needed, camera aperture should be increased.
3. The orange filter helped the models' skin looked rosy the most.
4. The colored filters did not provide smooth effect on the skin, but soft light could be substituted.

ACKNOWLEDGMENTS

REFERENCES

1. *"Cosmetics Industry Data."* National Science and Technology Development Agency. N.p., 7 Nov. 2012. Web. 24 Mar. 2015. <http://www.nstda.or.th/industry/cosmetics-industry>.

2. Sanoachitt, Wallapa. *"Cosmetics Market "Grew Silent," But a Tremendous Value."* Manager 360. N.p., 23 Jan. 2015. Web. 23 Mar. 2015. <http://gotomanager.com/content/ cosmetic-market>. [Thai]

3. Panyawong, Chawagun. *"Discourse of Skin."* Media Arts and Design. N.p., 2013. Web. 18 Mar. 2015. <http://www.mediaartsdesign.org/project_detail.php?project_id=268>. [Thai]

4. *"What Does Beautiful Skin Look Like?"* Woman and Kid. N.p., n.d. Web. 26 Mar. 2015. <http://www.womanandkid.com/index.php/womanhealth/8-healthknowledge/99-what-nice-skin-look-like>. [Thai]

5. *"Cosmetic Filter"*. LEE Filters. N.p., 2015. Web. 18 Mar. 2015. <http://www.leefilters.com/lighting/packs.html>.

6. Nipat, Paiboon. *Color Management for Graphic*. Bangkok: SE-ED Ucation, 2008. Print. [Thai]

7. Allen, Elizabeth, and Sophie Triantaphillidou. *"The Manual of Photography"*. Oxford: Elsevier/Focal, 2011. Print.

8. Langford, Michael. *Advanced Photography*: A Grammar of Techniques. London: Focal, 1980. Print.

9. Phanboondet, Bensriya. *"Colors and Interpretive Emotions."* N.p., 2016. Web. <http://www.km-web.rmutt.ac.th/?p=98>. [Thai]

10. Khotcharus, Renu. *Guide to Love Skin*. N.p.: Chulalongkorn U, 2000. Print. [Thai]

11. Thantranon, Veeranich. *Technical Metering Digital Camera*. N.p.: MIS Soft Tech, 2007. Print. [Thai]

12. *"What's Beauty Skin?"* N.p., 2013. Web. <http://ibio.co.th/index.php?route=news/news&news_id=14>. [Thai]

13. Niekerk, Neil Van. *Direction and Quality of Light: Your Key to Better Portrait Photography Anywhere*. N.p.: Craig Alesse, 2013. Web. <http://soul-foto.ru/photo_books/Neil%20van%20Niekerk.%20Direction%20and%20Quality%20of%20Light.%20Your%20Key%20to%20Better%20Portrait%20Photography%20Anywhere.%202013.pdf>