An analysis of colour matching of the skin colour and the lipstick colour — In the case of Japanese —

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ABSTRACT

In this study, the warm – cool evaluation of the model skin colours and the lipstick colours was tried; and the matching of the skin and the lipstick colour combinations was investigated by the paired comparison method.

It was clarified that the judgement of the suitability of the lip colours effected by the skin colours. The results obtained, however, was different from the base theory that widely used for colour coordinating method in Japan. The hue and the lightness of the skin and lipstick colour, therefore, have to be considered when we make a suitable colour combination.

1. INTRODUCTION

Many coordinating methods for the personal colours are introduced in Japan.[1] Japanese colourists, who advices how to select the colour of clothing, cosmetics, and so on, judge whether the colour is well-matched or ill-matched by using these methods. Most of these methods are based on the assumption that there are two colour category namely the 'warm' group and the 'cool' group, and the colours belong to the same category are judged well-matched. For example, the skin colours are divided into the yellowish (ocher) group or the bluish (pink) group, and these groups are taken as the key for finding the well-matched colour. However, warm – cool feature in these methods is contrary to generalities, and the scientific bases for these methods are not shown clearly.

In this study, the warm – cool evaluation of the model skin colours and the lipstick colours was tried; and the matching of the skin and the lipstick colour combinations was investigated by the paired comparison method.

2. METHOD

The experimental part of this study consisted of two parts. The first one (Exp. I) was for the warm – cool evaluation of the model colours, and second one (Exp. II) was for estimation of the colour combination well-matched or not. The model skin colours were selected from "Fashion colour recipe"[2] and the model of lipstick colours were selected from "Munsell Book of Colour". They are shown in Figure 1 with the Munsell notation.

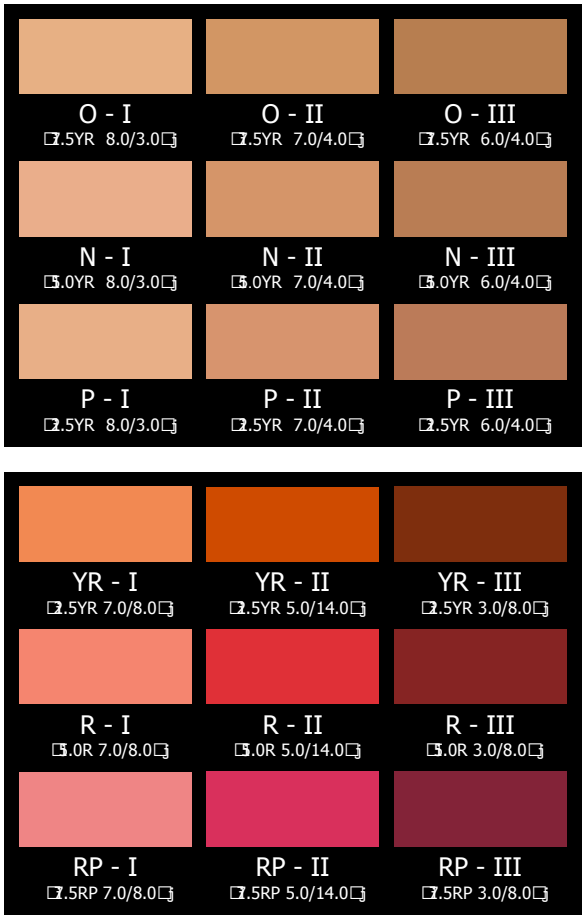

Figure 1: Color used for the experiment. (Munsell notation)

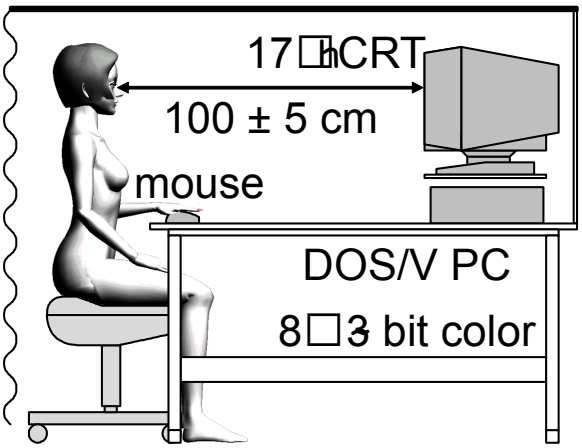

Figure 2: Illustration of the experimental environment.

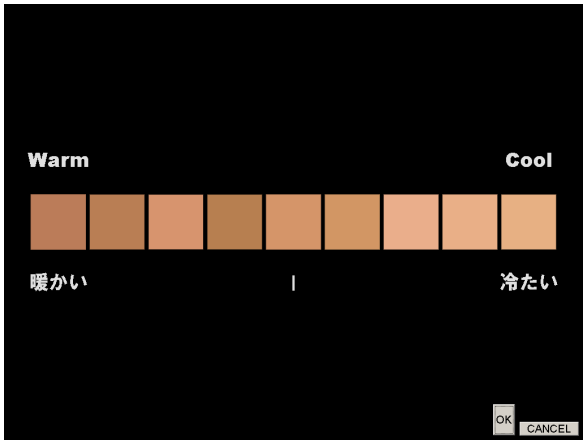

Figure 3: The stimulus portrait used in Exp. I for the evaluation of the warm – cool sensation.

In Exp. I, a DOS/V computer system with 17 inch CRT display (1024 × 768 pixels^2) was used for indication of the nine square model stimulus (96 × 96 pixels^2) put side by side as shown in Figure 2. The colours were strictly represented by using the colorimetric data of the CRT display. The computer system was set in the dark booth for prevent the external lights, and the experimental subject (n = 30, female university students) sat in ca. 100 ± 5 cm front of the displays as shown in Figure 3. The experimental subjects arranged the order of the stimulus by the mouse operation. After the operation the stimulus were given the point from -1 (warm) to 1 (cool) as a result of their position in the order.

In Exp. II, the colour combination stimuli, as shown in Figure 4, were used for the paired comparison method. The colours used were selected considering the warm – cool values obtained by Exp. I. The O-I, as the coolest skin colour, and the P-III, as the warmest, were used for the skin colour of the face model. These were combined with the nine lipstick colours that were same as used in Exp. I. The experiment has run in the same condition as Exp. I. The experimental subjects selected one face model that she judged the more matched combination by mouse operation. Then the stimuli were changed to another pair and the selection repeated until all the stimuli combinations were used out.

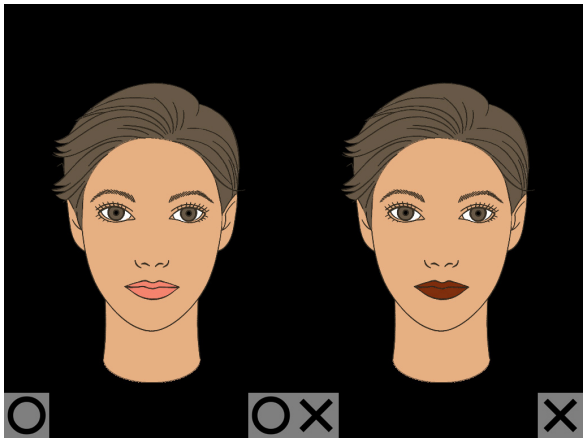

Figure 4: The stimulus portrait used for the paired comparison method. (Exp. II)
Skin colour; O-I, lip colour; R-I and YR

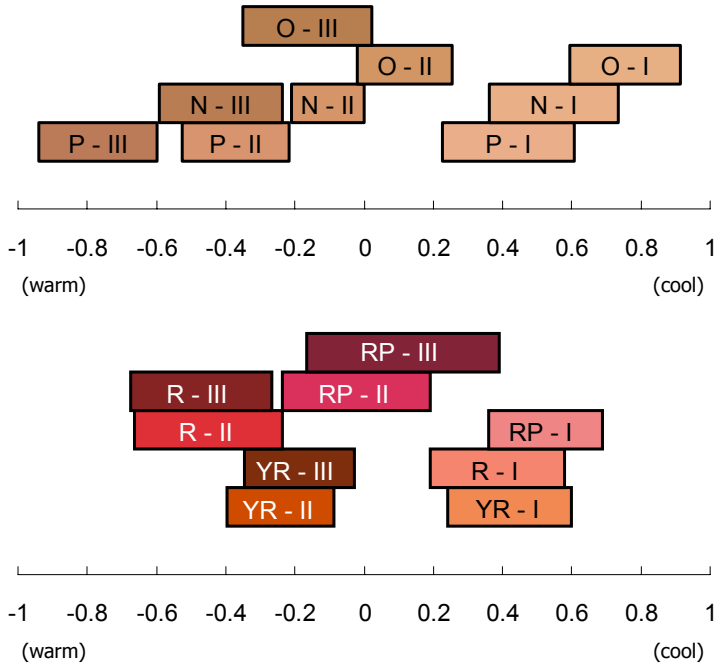

Figure 5: Result of the warm – cool evaluation of the skin colours and lipstick colours. (95 % confidence interval.)

3. RESULTS

Figure 5 shows the result of the Exp. I. The pink and dark skin colours were perceived warmer than the ocher and light ones. These are consistent with the tendency recognized for general colours, and are contrary to the base assumption of the colour coordinating methods widely used in Japan. The lipstick colours were also consistent with the tendency recognized for general colours. The hue of red was evaluated as the warmest hue, and both of the yellowish and the bluish hue were evaluated cooler than the red hue. The effect of the lightness of the colour is able to be mentioned as the higher the value (lightness) of the colour, the cooler the evaluated value was.

In Exp. II, two skin colours were used, and the sensory scale σ were independently calculated by the Thurstone's case V method for each skin colour.

Figure 6 shows the results obtained by using the O-I as skin colour, and Figure 7 shows that by using P-III. These figures show the relation between the warm – cool values and the suitability, and the difference of the shape of the curves suggest that the judgement of the well-match or ill-match of the lip colours effected by the skin colours. There was, however, no clear correlation between the suitability and the warm – cool value.

On the other hand, Figure 8 and Figure 9 show the effects of the hue of the lip colour on the judgement of the suitability. The hue of red on both of the skin colour was estimated high suitability. Both of the yellowish lip colour and the bluish (purplish) lip colour were evaluated lower than the pure red.

Furthermore, Figure 10 and Figure 11 show the relationship between value (lightness) of the lip colour and the suitability. The effects of the value (lightness) in these figures were inversely. In the case of the skin colour of O-I, that is the lighter skin colour, the light colours were evaluated high suitability as shown in Figure 10. To the contrary, the dark colours on the skin colour P-III were estimated high suitability as shown in Figure 11. In this case, the suitability of the hue of YR was all low.

4. CONCLUSIONS

The warm – cool evaluation was effected not only by the hue of the colour but also by the lightness of the colour. In some colour coordination method, it is mentioned that the bluish colour gives cool impression and yellowish colour gives warm. The results obtained in this study, however, indicated contrary tendency.

By the paired comparison method of skin and lip colour combination, it was shown that the

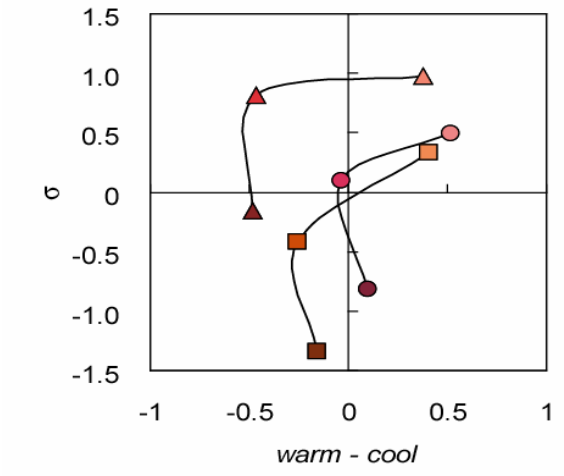

Figure 6: Relationship between warm-cool value of the lip stick colour and σ value obtained by Exp. II.
Skin Colour: O-I
Hue: ●; RP, ▲; R, ■; YR

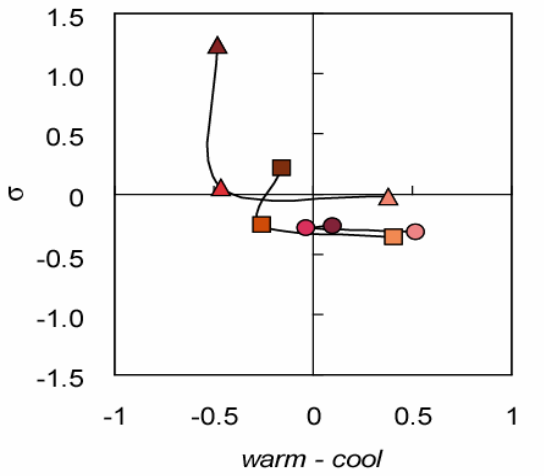

Figure 7: Relationship between warm-cool value of the lip stick colour and σ value obtained by Exp. II.
Skin Colour: P-III
Hue: ●; RP, ▲; R, ■; YR

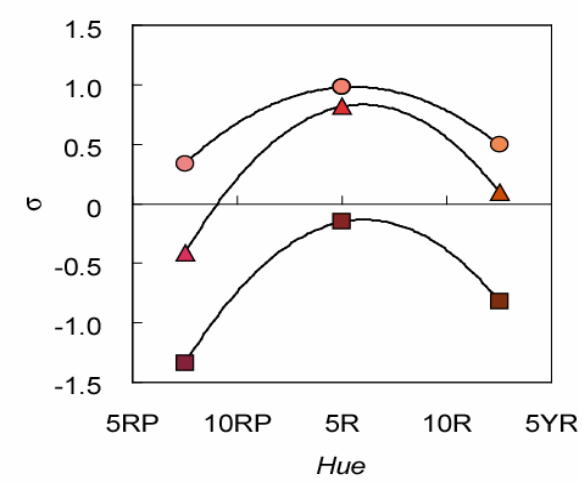

Figure 8: The effect of Hue of the lip stick colour on σ value obtained by Exp. II.
Skin Colour: O-I
Value (lightness): ●; I, ▲; II, ■; III

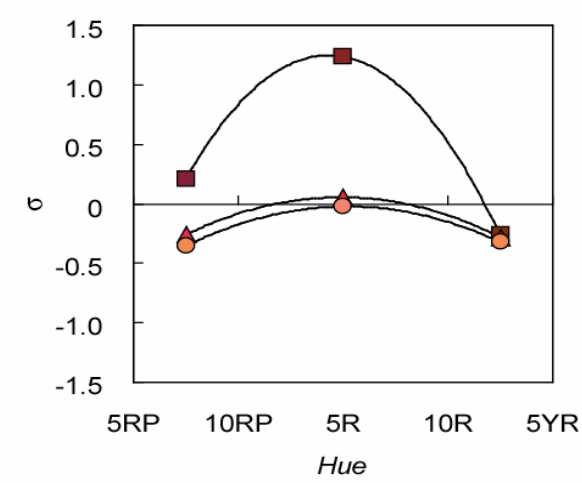

Figure 9: The effect of Hue of the lip stick colour on σ value obtained by Exp. II.
Skin Colour: P-III
Value (lightness): ●; I, ▲; II, ■; III

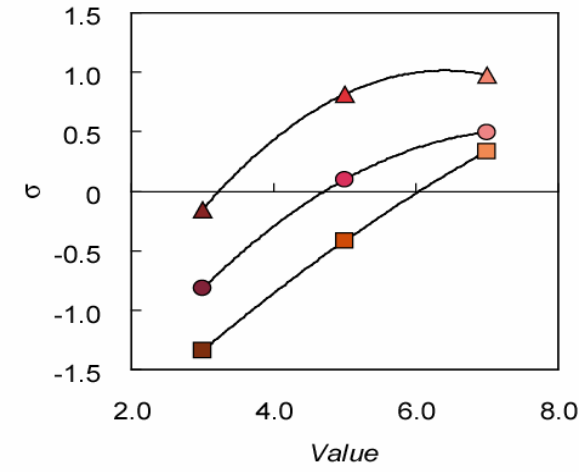

Figure 10: The effect of Value of the lip stick colour on σ value obtained by Exp. II.
Skin Colour: O-I
Hue: ●; RP, ▲; R, ■; YR

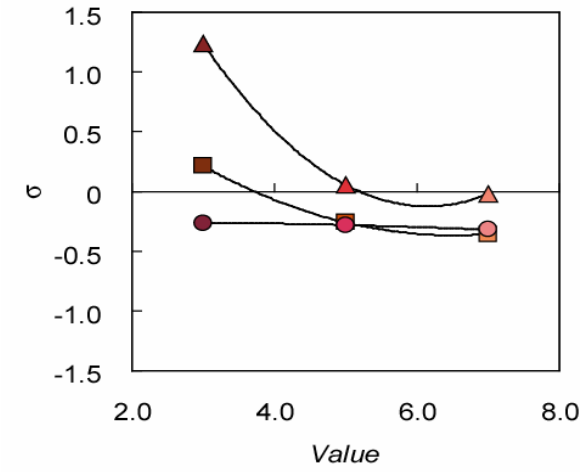

Figure 11: The effect of Value of the lip stick colour on σ value obtained by Exp. II.
Skin Colour: P-III
Hue: ●; RP, ▲; R, ■; YR

judgement of the well-matched or ill-matched of the lip colours effected by the skin colours. However, there was no clear correlation between the suitability and the warm – cool value. The hue of red on both of the skin colour was estimated high suitability. The effects of the value (lightness) for light skin colour and dark one were inversely. Therefore, the colour coordinating methods based only on the warm – cool conception or on the hue of the colours are inadequate. The hue and the lightness of the skin and lipstick colour have to be considered when we make a suitable colour combination.

References

1. K. Okemura, “Finding your true colors (in Japanese),” Cyukei Publishing (1994); R. Knapp, “Beyond the color explosion”, Rainy Day Publishing (1984).
2. Editorial Department of Fashion Color, “Fashion colour recipe (in Japanese),” Japan Color Enterprise (1999); Japan Color Research Institute, “The 15 skin color card,” Japan Color Enterprise (2002).