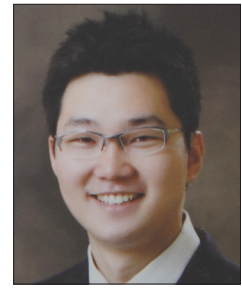


인종 및 성별에 따른 얼굴의 미적 인식의 차이

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Different Perceptions of Facial Attractiveness According to Race and Gender

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There have been few studies investigating the differences in the perception of facial attractiveness according to gender, races and ethnicity. This study was conducted to determine whether different races or genders show actual differences in the perception of beauty. Using 5 composite faces of different races, this survey was designed on 486 participants from different races and ethnicities. Photographs of the composite faces were displayed on a large poster at Incheon International Airport and passersby were asked to take part in the survey regarding which composite face was the most attractive. Data were statistically analyzed to determine differences in beauty perception in terms of gender, race and ethnicity. There were significant differences in the perception of the most attractive face and the least attractive face according to gender. There were significant differences in the perception of the most and least attractive face according to race. Multivariate analysis also revealed that there were different perceptions of facial attractiveness according to ethnic backgrounds. The results of this study suggest that the perception of facial attractiveness may differ according to gender, race and ethnicity, and that some unique or peculiar patterns of beauty perception may exist.

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Key Words: Beauty; Perception; Gender identity; Population groups

I. INTRODUCTION

Some previous studies have reported that beautiful faces have a universal standard, while others have demonstrated that the perception of facial attractiveness differs according to gender, race and ethnicity.¹⁻⁵ They presented composite faces of

different races. They also insisted that the stereotypic analysis of beauty must be abandoned and that clinicians must understand cultural diversity and consider the beauty of other races. The conception of beauty between races seems to differ among investigators. Wong et al.⁶ and O'Toole et al.⁷ have shown that there are many measurable morphologic differences in facial structure, which play an important role in the perception of facial attractiveness. It has been suggested that people's views of facial attractiveness are remarkably consistent, regardless of race, nationality and age.^{8,9} There have been some studies about differences in the perception of facial attractiveness according to age or gender.¹⁰ However, there have been few studies about differences in the perception of facial attractiveness among racial groups. This study was conducted to determine whether or not there are different perceptions of beauty among peoples who have different racial or ethnic backgrounds.

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II. MATERIALS AND METHODS

We have previously reported a preliminary study of five composite faces of different races made using a morphing technique^{11,12} but there is no research about actual attractiveness preference of people about these five composite faces. We hypothesized there were different perceptions of facial beauty according to gender and race; we also hypothesized there may

Table 1. Gender of 486 Participants in the Racial and Ethnic Groups

Race	No. of Females	No. of Males	Total
Asians	113	89	202
Black	41	32	73
Caucasians	67	48	115
Others	30	53	83
Total	251	222	473
Ethnic Origin by Nationality	No. of Females	No. of Males	Total
Korean	9	22	31
Japanese	12	10	22
Chinese	25	30	55
African	15	29	44
European	13	11	24
German	5	3	8
Mediterranean	2	7	9
North-American	28	37	65
Central-American	4	5	9
South-American	6	17	23
Arabian	7	12	19
East Asian	13	10	23
Indian	10	12	22
Malaysian	7	13	20
Oceanian	6	2	8
Others	30	10	40
Total	192	230	422

Participants consisted of 223 males and 164 females (13 people did not answer regarding their gender). There were 202 Asians, 73 black people and 115 Caucasians. Among 486 participants, 64 people did not answer regarding their gender or nationality.

be some differences in the perception of facial beauty in terms of ethnicity or nationality. Our five composite faces were used to analyze people's perceptions of facial attractiveness, and a survey was conducted on 486 subjects selected from different races. Thirteen subjects did not answer regarding their gender and 64 subjects did not answer regarding their gender or nationality. Participants were comprised of 222 males and 251 females; there were 202 Asians, 73 blacks and 115 Caucasians. The ethnic subgroups are summarized in Table 1.

Photographs of 5 composite faces were displayed on a large poster (84.6×137.5 cm²) at Incheon International Airport and passersby were asked to participate in the survey regarding which composite face was the most or the least attractive (Fig. 1). Data from each participant were statistically analyzed to determine whether there were differences in beauty perception according to gender and race. SAS 8.1 (SAS Institute Inc, Cary, NC) was used for data files and univariate and multivariate test were accomplished for statistical analysis. Between-group differences were examined using Pearson's chi-square tests.

III. RESULTS

A. Univariate Analysis

Variables for group difference in the perception of facial attractiveness were gender (female or male), race (Asians, Blacks and Caucasians) and ethnicities. The most attractive face among the 5 composite faces was primarily determined by rank. The average rank was 3.35 for the black composite face, 2.4 for the Caucasian composite face, 2.58 for the Chinese composite face, 2.9 for the Japanese composite face, and 3.77 for the Korean composite face. Excluding variables of race and gender, the participants reported that the faces were in the following order of attractiveness, from most to least: the Caucasian, Chinese, Japanese, black, and Korean composite faces. The test of goodness of fit showed that there were significant differences

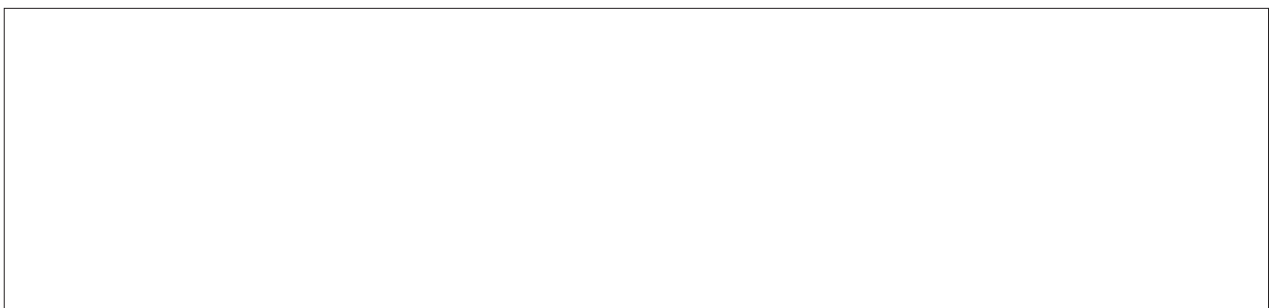


Fig. 1. Photographs of 5 composite faces were displayed on a large poster (84.6×137.5 cm²) at Incheon International Airport and passersby were asked to participate in the survey regarding which composite face was the most or the least attractive in sequence. The black, Caucasian, Chinese, Japanese and Korean average composite faces are seen from left to right.

in the most and the least attractive face ($p<0.0001$). However, the relative rank of each composite face was meaningless because the number of participant in each race was not identical: the number of Caucasian participants was larger than those of other races. Racial variables are important in examining differences in the perception of facial beauty between ethnic groups. In this study, the participants consisted of 202 Asians (31 Koreans, 22 Japanese and 55 Chinese), 73 blacks, and 115 Caucasians, accordingly, in which the Caucasian composite face ranked higher than the others.

In terms of gender differences, Pearson's chi-square tests revealed that there were significant differences in the perception of the most attractive face ($p=0.023$) and the least attractive face ($p=0.002$) according to gender characteristic (Table 2). Females reported that, in decreasing order, the most attractive faces were Caucasian, Chinese, Japanese, black and then Korean. However, males reported that, in decreasing order, the most attractive faces were Caucasian, Japanese, Chinese, black and Korean. Strictly speaking, apart from statistical significance, we may regard that there are no remarkable important differences because there was only a difference of Japanese and Chinese in the relative rank of each composite face between the two

genders. Males reported that the Japanese composite face was more attractive than the Chinese composite face, while females reported that the Chinese composite face was more attractive than the Japanese composite face. Females reported that, in decreasing order, the most unattractive faces were Korean, black, Japanese, Chinese, and Caucasian, while males reported that, in decreasing order, the most unattractive faces were black, Korean, Chinese, Japanese, and Caucasian composite faces.

In terms of racial difference, Pearson's chi-square tests revealed that there were significant differences in the perception of the most attractive face ($p<0.001$) and the least attractive face between different races ($p<0.001$) (Table 2). However, Pearson's chi-square tests also revealed that there was no significant difference in the perception of the most attractive face ($p=0.213$) or the least attractive face between Korean, Chinese, and Japanese ($p=0.229$). Asians reported that the Chinese composite face was the most attractive, black people reported that the black composite face was the most attractive, and Caucasians reported that the Caucasian composite face was the most attractive (Fig. 2). Meanwhile, Asians reported that the black composite face was the least attractive, while blacks and Caucasians reported that the Korean composite face was the least attractive (Fig. 3).

Table 2. Gender and Racial Differences in Perceptions of Facial Attractiveness

Gender Difference	χ^2	df	Significance
The Most Attractive Face	11.393	4	0.023*
The Least Attractive Face	16.960	4	0.002*
Racial Difference			
The Most Attractive Face	147.41	8	0.000
The Least Attractive Face	70.921	8	0.000

* $p<0.05$ (Pearson's chi-square test); df, degree of freedom

B. Multivariate Analysis

To evaluate factors, such as race and gender, we performed multivariate analysis of the data and logistic regression analysis of each composite face. The results are summarized in Table 3.

There were no significant differences in preference for the black composite face between the 2 genders. However, there were significant differences in preference for the black compos-

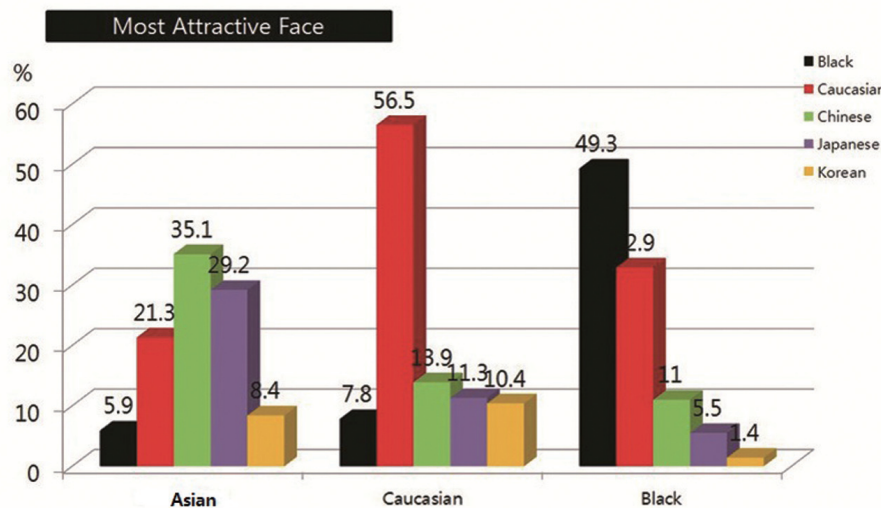


Fig. 2. Asians rated the Chinese composite face as the most attractive, and Caucasians were more attracted to the Caucasian composite face than to the other composite faces. Black people rated the black composite face as the most attractive.

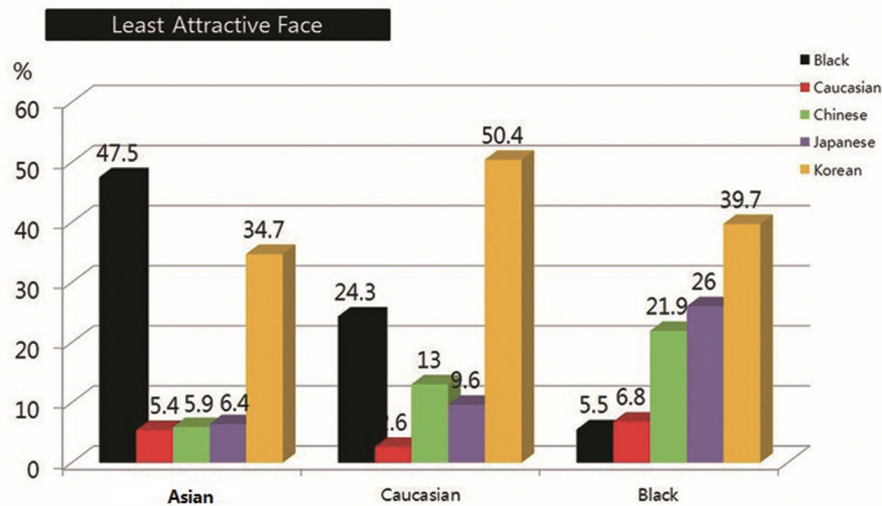


Fig. 3. Asians rated the black composite face as the least attractive, Blacks and Caucasians rated the Korean composite face as the least attractive.

Table 3. Multivariate Analysis of the Data and Logistic Regression Analysis of Each Composite Face

	Black CF		Caucasian CF		Chinese CF		Japanese CF		Korean CF	
	OR	p	OR	p	OR	p	OR	p	OR	p
G	0.613 (0.311~1.212)	0.159	1.667 (1.056~2.631)	0.0281	1.432 (0.881~2.328)	0.1475	0.568 (0.328~0.983)	0.0433	0.561 (0.247~1.273)	0.1669
r1	1.187 (0.469~3.002)	0.7173	5.098 (3.056~8.504)	<0.0001	0.311 (0.169~0.570)	0.0002	0.311 (0.161~0.060)	0.0005	1.154 (0.519~2.565)	0.7258
r2	15.396 (7.291~32.512)	<0.0001	1.816 (0.990~2.331)	0.0539	0.237 (0.108~0.525)	0.0004	0.135 (0.047~0.388)	0.0002	0.144 (0.019~1.105)	0.0624

CF, Attractive Composite Face; OR, odds ratio in 95% CI (g=gender; 0 for male and 1 for female) and racial (r=race; Asians [r1=0, r2=0], Caucasian [r1=1, r2=0], Black [r1=0, r2=1]) In this model, $\log(p/1-p) = \alpha + \beta_1\gamma_1 + \beta_2\gamma_2 + \beta_3\gamma_3$, $p = \text{Prob}(\text{rank of face}=1)$.

ite face between individual racial groups depending on whether participants' race was black or not ($p < 0.0001$). The black composite face was more attractive to black people than to Caucasians or Asians (OR, odds ratio=15.4). In particular, black males expressed a strong preference for the black composite face (estimated coefficient=0.55).

There were significant differences in preference for the Caucasian composite face between the 2 genders ($p = 0.028$) and there were significant differences depending on whether participants' race was a Caucasian or not ($p < 0.001$). Caucasians preferred the Caucasian composite face than Asians or blacks (OR=5.1). Males expressed a stronger preference for the Caucasian composite face than females (OR=1.67). Caucasians females reported that the Caucasian composite face was the most attractive (estimated coefficient=0.64).

There were no significant differences in preference for the Chinese composite face between the 2 genders ($p = 0.1475$). Asians and blacks more preferred the Chinese composite face than Caucasians (OR, 3.2=1/0.311). Caucasians and Asians have stronger preferences for the Chinese composite face than blacks

(OR, 4.2=1/0.237). Asians females have a higher preference for the Chinese composite face (estimated coefficient=0.39).

There were significant differences in preference for the Japanese composite face between the 2 genders and between the racial groups. ($p = 0.043$) Males preferred the Japanese composite face (estimated coefficient=0.35), while females did not (OR=1.76). Non-Caucasians preferred the Japanese composite face, while Caucasians did not (OR, 3.2=1/0.311). Non-black participants expressed a 7.4-fold stronger preference for the Japanese composite face than black participants (OR, 7.4=1/0.135).

There were no significant differences in preference for the Korean composite face between the racial groups and between the 2 genders. This face did not seem to be attractive to most participants.

To examine the ethnic differences, ethnicities of the participants were divided into African, Arabian, Chinese, East Asian, Europeans, German, Indian, Japanese, Korean, Malaysian, Mediterranean, Central-American, North American, Oceanian and South American ethnicities. The results are summarized in

Figures 4 and 5. To examine the ethnic differences in perception of facial attractiveness, we measured the relative values of preference ratios higher than 0.3. As a result, African and Mediterranean participants expressed a strong preference for the black composite face; the black composite face was attractive to 72% of African males. The Caucasian composite face was more attractive to Arabian, European, German and Oceanian participants than to African, Japanese, Chinese, Korean, Malaysian and East-Asian participants. Asians expressed a stronger preference for the Chinese composite face than

other ethnic groups; 67% of Japanese participants expressed a strong preference for the Chinese composite face. Japanese, Malaysian and Asian males expressed a strong preference for the Japanese composite face. Although most Asians expressed a strong preference for the Japanese composite face relatively, this face was not so attractive to Asian females. Chinese males expressed a stronger preference for the Japanese composite face than Chinese females. There were no significant differences in preferences for the Korean composite face between the ethnic groups. In this study, although the number of participant in

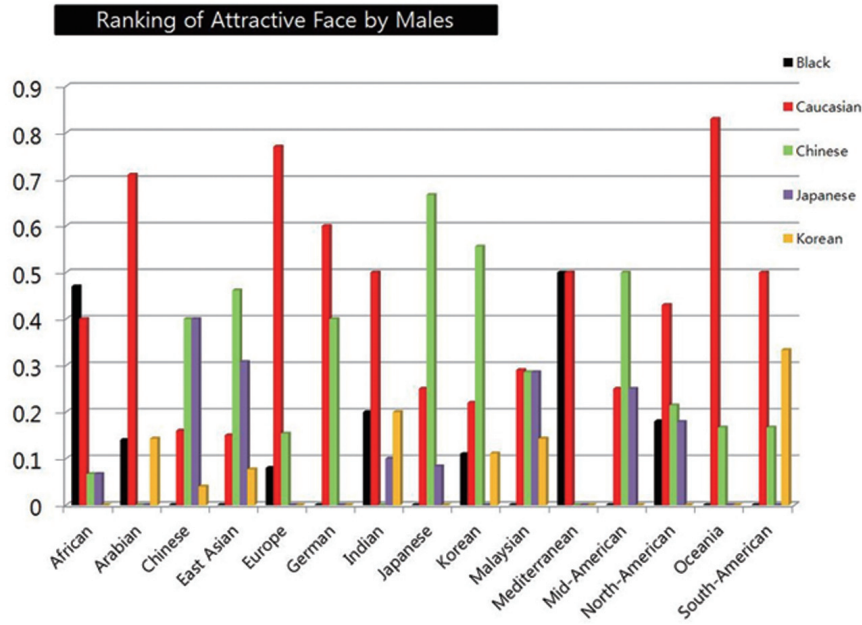


Fig. 4. Ethnic differences in perceptions of facial beauty among male participants.

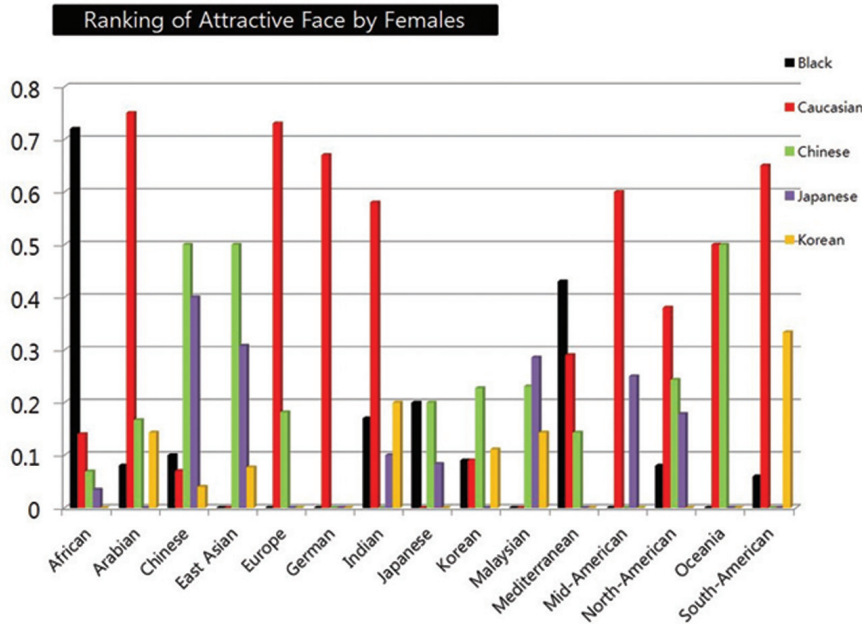


Fig. 5. Ethnic differences in perceptions of facial beauty among female.

some ethnic groups was relatively low, we obtained the following results; The black composite face was preferred by African and Mediterranean participants. The Caucasian composite face was more attractive to European, Oceania, Arabian, German, South American, Indian, Central-American, North American and Mediterranean participants. The Chinese composite face was more attractive to East Asians, Chinese, Japanese and Korean participants. The Japanese composite face was more attractive to Malaysian, East-Asian, Chinese, Central-American, and Japanese participants. The Korean attractive face was only attractive to South Americans.

IV. DISCUSSION

It is controversial whether the perception of facial attractiveness varies among different races, genders and ethnic groups. Our 5 composite faces were composed from faces of living celebrities of each race and possessed unique racial characteristics in the shape-based properties of their face. The Japanese composite face appeared to be cute and had a relatively long face, slightly slanted-eyes, a sharp chin and chubby cheeks. The Chinese composite face had relatively white skin, narrow cheeks, a slim and thin face, and a narrow chin. The Caucasian composite face was masculine, with a narrow palpebral height, an angulated and square-shaped mandible, a protruding cheek and fuller lips compared to the average Caucasian face. The black composite face had a narrow nose, a small and acute eyes, a small upper lip and a slender chin compared to the average African face. The Korean composite face had a wider facial width and a more round facial shape than the other composite faces. Although the composite faces were not standard or ideal faces, they were very representative of their racial or ethnic features. Wilkins et al¹³ have shown that more feminine and less masculine appearances appeal to women but not men. However, the results of our study imply that facial attractiveness may not simply be explained by femininity or masculinity alone because Asians preferred the masculine Caucasian composite face to the feminine and childish Korean composite face.

In this study, it was found that perceptions of facial attractiveness significantly differed according race and gender. We used Korean, Japanese and Chinese composite faces under the hypothesis that there might be some differences in the perception of facial beauty among Koreans, Chinese and Japanese but the differences were not significantly different. In addition, there were no significant differences in the perception of facial beauty between the 2 genders because the overall perception of facial attractiveness was very similar except that males preferred the Japanese composite face to the Chinese composite

face, while females preferred the Chinese composite face to the Japanese composite face. These results coincide with those of a study conducted by Morar and Stein.¹⁴ They mentioned that there are no significant differences in ideal facial profiles between females/males in rural areas and those in urban areas. Based on the overall rank of the composite faces, it is thought that people may have similar perceptions of facial attractiveness irrespective of gender. The results are similar to those of a previous study conducted by Perrett et al.¹⁵ They reported that the perception of facial attractiveness and aesthetic judgment of face shape are similar across different ethnic backgrounds.

As for racial differences, Asians, Caucasians, and black people preferred composite face of their own race and did not pay attention to other-race faces, which is similar to the result of a previous study conducted by Lipp et al.¹⁶ Asians rated the black composite face as the least attractive, and Caucasians and blacks rated the Korean composite face as the least attractive. Since traditional morphometrics or studies using different racial prototypes had some limitations, there have been various methods for assessing attractiveness among races and genders¹⁷. Our study has different implications in studying racial prototypes because our composite faces were created from real celebrities, which reflect peoples' common preferences for facial beauty. Our results regarding inter-racial differences may be explained by the other-race effect. It is well known that people recognize faces of their own race more accurately than faces of other races.^{16,18-21} Unexpectedly, there were no significant differences in perceptions of facial attractiveness among Korean, Chinese and Japanese participants. This may be due to different cultural backgrounds among participants. Further studies with a larger sample size are needed to confirm our results. Based on these results, it is believed that preferences for facial attractiveness are socially organized²².

V. CONCLUSION

In conclusion, the results of this study suggest that perceptions of facial attractiveness may differ among different racial groups and genders, although there may be unique and common patterns in the perception of facial attractiveness in different ethnic groups. Because beauty perception is not a fixed one and there is no universal standard in facial beauty, we insist that aesthetic plastic surgeons must abandon the stereotypic analysis of facial beauty and should understand different facial attractive perception among different races or genders.

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