

# A STUDY OF AFFECTING FACTORS OF PERCEIVED AGING IN TWINS

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## Abstract

**Background:** There have been many studies on factors affecting the perceived aging of the face. However, few studies have been conducted on perceived aging in identical twins.

**Methods:** Twenty-four pairs of identical twins aged 24-64 years old were recruited and their facial images were taken by digital camera. Two clinical researchers visually evaluated for the aging signs and then. Volunteer's was divided into a relatively old-looking group and a relatively young-looking group, and statistical analysis was performed.

**Results:** There was a significant ( $p < 0.05$ ) difference between the relatively young-looking group and the old-looking group in some morphological indicators (eg. corners of the mouth), and there were also significant differences in some skin color-related indicators (eg. left cheek pigmentation). As a result of binary logistic regression analysis, dark circles were a significant ( $p < 0.05$ ) influencing factor on perceived aging. Additionally, in order to compare skin visual state of each group, the virtual facial images were generated in which each defect was superimposed on the 5 people in each group. The images showed looking properties very well.

**Conclusion:** Visual factors such as wrinkles and skin color are influencing factors of perceived aging, and improvement of these influencing factors will lead to a more youthful-looking face.

**Keywords:** perceived aging; young looking; old looking; twins; superimposed face

## INTRODUCTION

There have been many studies on factors affecting the perceived aging of the face, and it is empirically known that the face with more wrinkles, the darker the skin, the uneven color, and the more sagging, looks the older the face [1-4]. The best research method be a longitudinal study in which the subjects are flowed up, but it is very difficult to conduct the study realistically as it teases a lot of time and effort. Therefore, most of these aging studies were cross-sectional studies, and correlation analysis or regression analysis was performed for age and skin characteristics. People infer age recognition from other people's faces based on the relationship between age and skin characteristics [5-7]. In order to control the face shape that can affect the perception of facial aging, in some studies, the effect of each factor on the same face was studied by computer simulation [8, 9]. However, few studies have been conducted on perceived aging in identical twins. Therefore, in this study, factors affecting perceived aging in identical twins were discovered and their influence was studied.

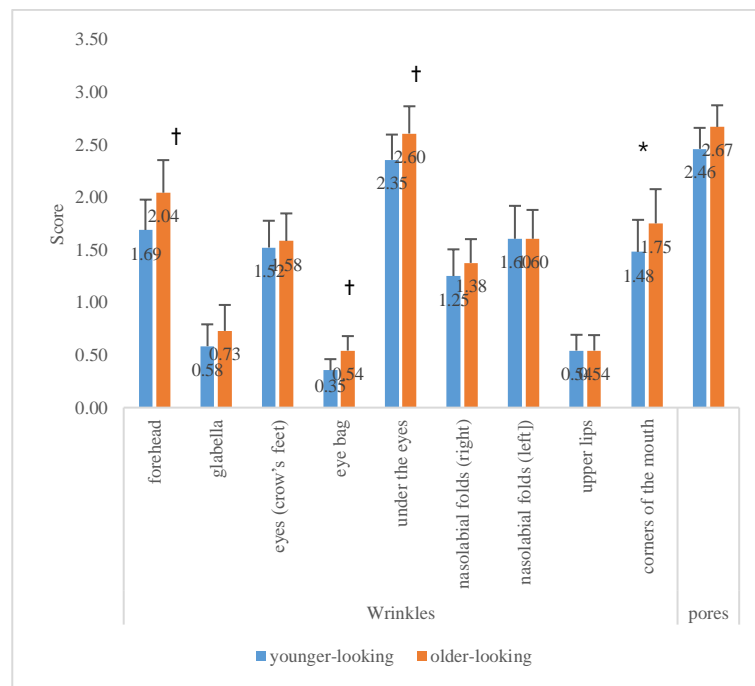
## MATERIALS & METHODS

Twenty-four pairs of identical twins aged 24-64 years old (one pair being triplets) were recruited for this study. 48 volunteers, except for one of the triplets, facial images were taken by digital camera (VISIA-CR, Canfield, USA). Two clinical researchers visually evaluated for the wrinkles (forehead, glabella, eyes (crow's feet), eye bag, under the eyes, nasolabial folds, upper lips, corners of the mouth), pores, and skin color (redness, cheek pigmentation, cheekbones pigmentation, darkening of pigmentation, size of pigmentation, dark circles, and troubles) based on Skin Aging Atlas [10] and IGA (Investigator's Global Assessment). Volunteer's was divided into a relatively older-looking group and a relatively younger-looking group, and statistical analysis, paired t-test and binary logistic regression analysis, were performed (SPSS v24 (IBM, USA). Additionally, in order to compare skin visual state of each group, the virtual facial images were generated in which each defect was superimposed on the 5 people in each group by Multi Face™. Multi Face™ which new approach to visualize for volunteers face, was performed by google cloud vision api (Google, USA) and Image pro 10 (Media Cybernetics, USA).

## RESULTS

The results show figure 1, 2, and 3. There was a significant difference between the relatively young-looking group and the old-looking group in some morphological indicators. The sore of wrinkles of corners of the mouth, and total morphological indicators at older-looking group were significantly higher than younger-looking group's. Forehead and under the eye wrinkles were not significantly

different but the p-value was smaller than 0.1. Furthermore, there were also significant difference left cheek pigmentation and total pigmentation index scores between two groups. The further analysis, binary logistic regression analysis was performed. As a result, dark circles were a significant ( $p < 0.05$ ) influencing factor on perceived aging, and wrinkles, eye bags, and cheek pigmentation were not significant, but were analyzed as potential affecting factors on perceived aging ( $p < 0.1$ ) (Table 1). In addition, the defects superimposed facial image showed at Figure 4.

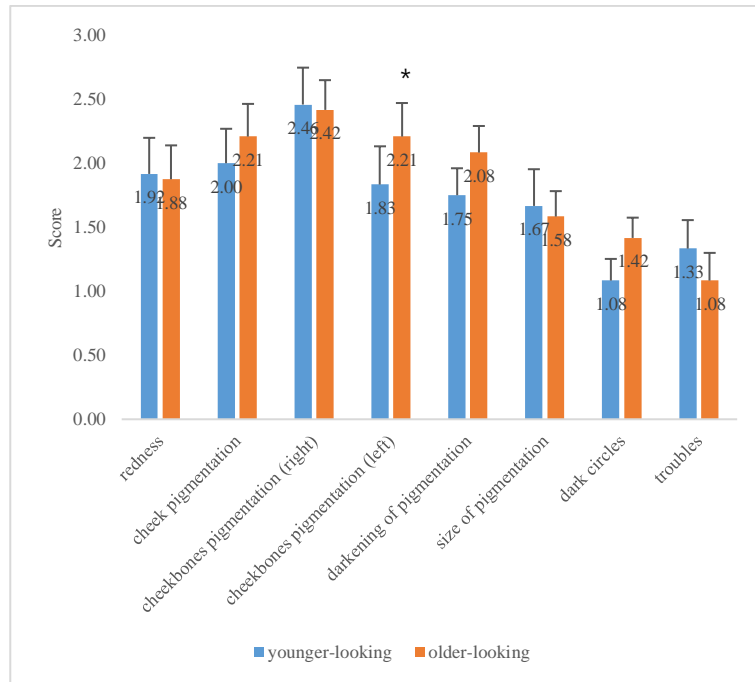


**Figure 1. Comparison results of morphological indicators between younger and older- looking groups.**

Data expressed Mean +/- SE (standard error)

†:  $p < 0.1$

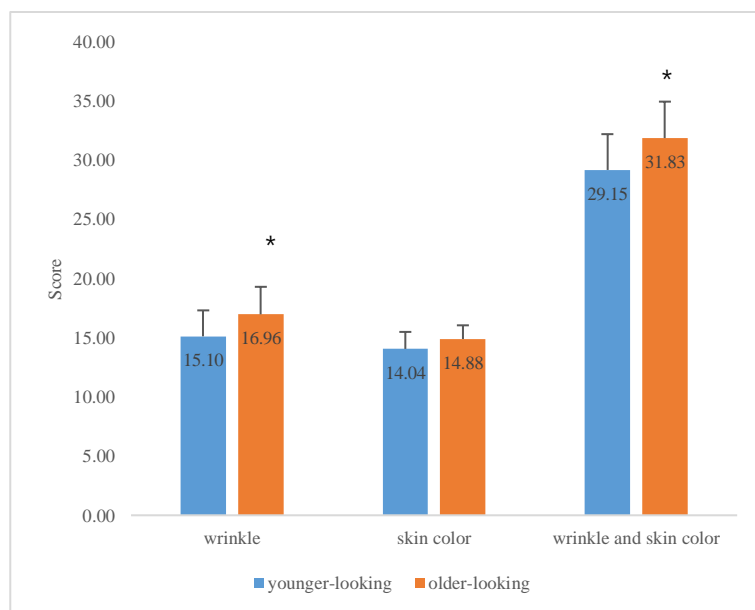
\*:  $p < 0.05$



**Figure 2. Comparison results of skin color related indicators between younger and older- looking groups.**

Data expressed Mean +/- SE (standard error)

\*:  $p < 0.05$



**Figure 3. Comparison results of score summation between younger and older- looking groups.**

Data expressed Mean +/- SE (standard error)

\*:  $p < 0.05$

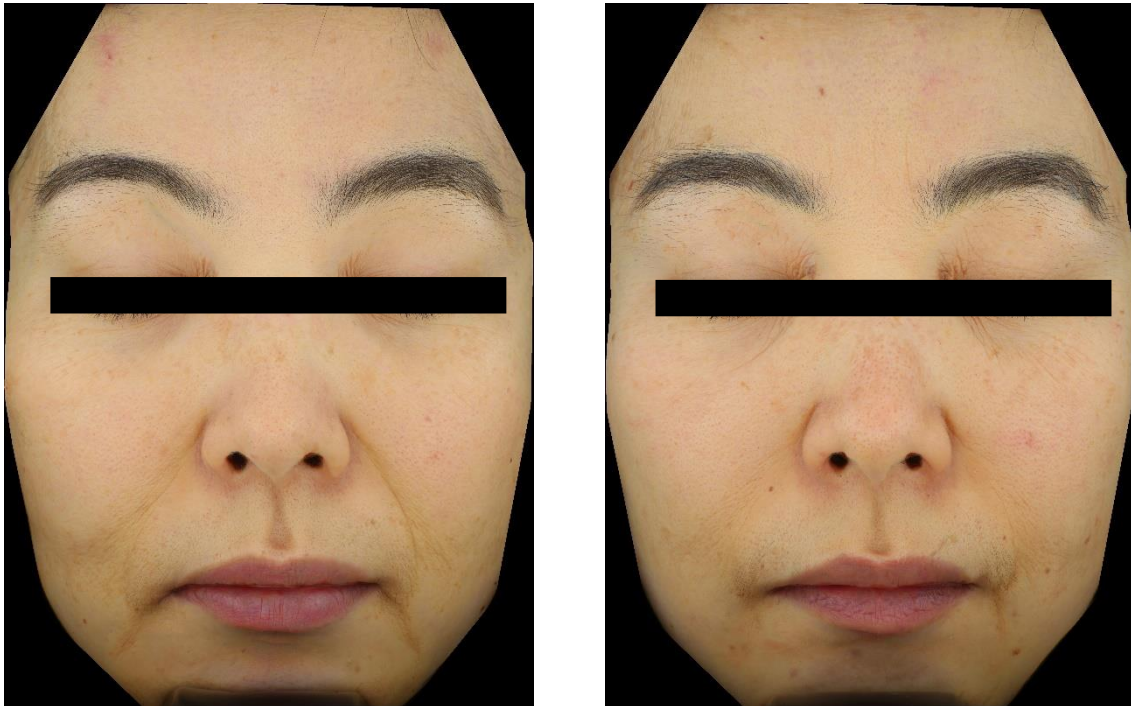
	B	S.E.	Wald	d.f	p-value	Exp(B)
eyes (crow's feet)	0.789	0.439	3.231	1	0.072	2.201
eye bag	-1.568	0.808	3.765	1	0.052	0.208
cheekbones pigmentation	-0.601	0.313	3.675	1	0.055	0.548
dark circle	-0.886	0.438	4.085	1	<b>0.043</b>	0.412
constant	1.779	0.842	4.463	1	0.035	5.925

**Table1. Results of binary logistic regression analysis**

Reference: older-looking

Method: backward stepwise

df: degree of freedom



**Figure 4. Superimposed facial image of 5 people in each group.**

Left image was younger-looking virtual facial and right image was older looking virtual facial

## **DISCUSSION**

In this study, results of binary logistic regression showed that dark circle was were a significant influencing factor on perceived aging. As dark circle was higher, the older-looking odds were increased. The wrinkles, eye bags, and cheek pigmentation were not significant, they seem the potential affecting factors on perceived aging. Furthermore, the crow's feet were analyzed as a negative effect on the relative younger looking. This result was considered to be a simple calculation result due to the insufficient number of volunteer for the analysis, because of the difficulty of tween volunteer recruitment. In the grand scheme, this study showed consistent results with previous study results. We generated superimposed facial, new approach the visualize some volunteers. It could compare the difference in the visual characteristics of the relative young or old looking group by superimposed facial image. These facial images showed well the skin properties such as wrinkle, pores, pigmentation, and etc. Although these images do not represent as we would expect for all skin characteristics of differences between two groups, this superimposed facial image could be a way to show the characteristics of a group more intuitively than the existing simple numerical expression.

## **CONCLUSION**

Visual factors such as wrinkles and skin color are influencing factors of perceived aging, and improvement of these influencing factors will lead to a more youthful-looking face.

## **ACKNOWLEDGMENTS**

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## **CONFLICT OF INTEREST STATEMENT**

NONE.

## REFERENCES

1. Akazaki, S., et al., *Age-related changes in skin wrinkles assessed by a novel three-dimensional morphometric analysis*. Br J Dermatol, 2002. **147**(4): p. 689-95.
2. de Rigal, J., et al., *The effect of age on skin color and color heterogeneity in four ethnic groups*. Skin Res Technol, 2010. **16**(2): p. 168-78.
3. Kim, H., et al., *Age-related changes in lip morphological and physiological characteristics in Korean women*. Skin Res Technol, 2019. **25**(3): p. 277-282.
4. Lee, M., J. Han, and E. Kim, *An evaluation of the effects of makeup on perceived age based on skin color in Korean women*. J Cosmet Dermatol, 2019. **18**(4): p. 1044-1051.
5. Fink, B., K. Grammer, and P.J. Matts, *Visible skin color distribution plays a role in the perception of age, attractiveness, and health in female faces*. Evolution and Human Behavior, 2006. **27**(6): p. 433-442.
6. Nkengne, A., et al., *Influence of facial skin attributes on the perceived age of Caucasian women*. Journal of the European Academy of Dermatology and Venereology, 2008. **22**(8): p. 982-991.
7. Mayes, A., et al., *Ageing appearance in China: biophysical profile of facial skin and its relationship to perceived age*. Journal of the European Academy of Dermatology and Venereology, 2010. **24**(3): p. 341-348.
8. Fink, B. and P.J. Matts, *The effects of skin colour distribution and topography cues on the perception of female facial age and health*. Journal of the European Academy of Dermatology and Venereology, 2008. **22**(4): p. 493-498.
9. Fink, B., et al., *Visual attention to variation in female facial skin color distribution*. Journal of Cosmetic Dermatology, 2008. **7**(2): p. 155-161.
10. Roland BAZIN, F.F., *SKIN AGING ATLAS*. Vol. 2. 2010, PARIS: MED'COM.