

THE POSSIBILITY OF “KANSEI” EVALUATION OF PREFERENCES THROUGH HUMAN FACES

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PERSONALITY, FACE, “KANSEI”

ABSTRACT

Consideration of “*Kansei*” for preference is necessary to embody a sensitive product adapted to his/her personality. “*Kansei*” evaluation of shape preference was carried out in this study. We considered the relationship between the results of the evaluations and the face shapes of the participants. 56 participants performed “*Kansei*” evaluation of shapes (figures). The shapes used as “*Kansei*” stimulation elements were geometrical figures resembling a human face, i.e. a rectangle, an inverted triangle, a circle, a square, and a triangle. The considered faces for classification were developed from face types we use to form an impression of another person. From this study, we can see that in general, people prefer shapes that don’t resemble the shape of their own face with the exception of a circle.

1. INTRODUCTION

Memory is different for each person. When we recall someone, we think of his/her "face" first then, we think of the other information about him/her. Memory is probably closely associated with the "face," but this is difficult to explain in words. ' *The face of a human being shows age, gender, race, personality, feelings, state of health*'(Leslie A. Zebrowitz、 1999). Such a point of view suggests that personal psychology and some physical characteristics are shown on the face. As we usually expect to recognize someone's personality through his/her face, a standard analysis is required to objectively obtain such personality recognition. If we want to understand personality and to provide sensitive product adopted to his/her personality, a basic "*Kansei*" study is necessary. We think we can recognize personality on the basis of facial characteristics such as face types, form of eyes, nose, mouth, ears, complexion, bilateral symmetry, expression and hair style. Furthermore we believe human faces have these recognizable characteristics. In some cases, we can remember face types such as round type, angular type, egg type, or long type as a basis to form impressions. In this study, we will consider face types that can become standards which people can rely on to explain the impression of faces. Finally, we are going to consider "face shape" and its relations with "*Kansei*" of shape preference.

2. "*KANSEI*" EVALUATION ON PREFERENCE

2. 1. DEFINITION OF "*KANSEI*"

The word "*Kansei*" is not only used in design but also in other domains. It involves various meanings, such as sensitivity, sense, aesthetics, feelings and love. Furthermore, "*Kansei*" is associated with high dimensional functions of the mind such as inspiration, intuitive power, pleasure, taste, curiosity, aesthetics, and creation. Harada (Tsukuba University 1998) provided a definition of "*Kansei*" through a questionnaire administrated to researchers of Tsukuba University regarding "*Kansei*". The definition is as follows:

1. It is subjective and cannot be expressed in words. Its representation includes a formation process which is hard to explain logically.
2. It is expressed with recognition, experience and native character.

3. It is an interaction between intuition and intellectual activity. It is a function of the mind that accomplishes the interaction between intuitive creation and intellectual activity.

4. It is an ability to accept and to evaluate a character intuitively.

5. It is a function of the mind to create an image.

"*Kansei*" in this study was defined as "an intuitive reaction to certain stimulation, and the ability to evaluate it."

2. 2. FUNCTION OF "*KANSEI*" ON PREFERENCE

Individuals have different preferences. We think that preference has two aspects, one based on reason, the other on "*Kansei*". When we use a product, rational preference would help us to recognize its function, and "*Kansei*" preference would help us to feel the pleasure it brings. Understanding preferences will help to satisfy users.

2. 3. "*KANSEI*" EVALUATION ON PREFERENCE

How do we evaluate "*Kansei*" of preferences, and how do we explain it? This study considers the possibility of a "*Kansei*" evaluation using a face scale.

In this research, the hypothesis is that information about the participants' faces is related to their "*Kansei*". As the first step, we analyzed the information about the participants' faces, and then investigated its correlation with the results from a "*Kansei*" evaluation.

3. RECOGNITION OF FACE CHARACTERISTICS AND "*KANSEI*" EVALUATION OF PREFERENCE

3.1. RECOGNITION OF FACE CHARACTERISTICS

We can receive many kinds of information about a person through their face. The person's gender and age are easily recognized. However, the person's character and state of health are hard to understand. Phrenology, physiognomy, and face diagnosis study human characteristics through

the face. We considered face-related studies such as these, and brain science, physiology, and anatomy.

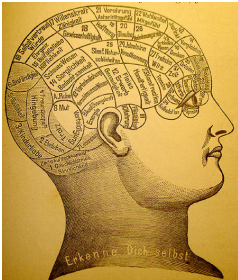

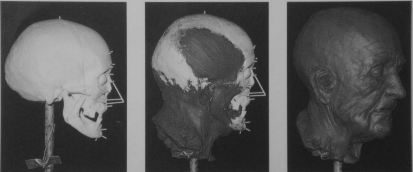
Research field of face characteristics	Study contents and example
<p>●Phrenology</p> <p>Phrenology (from Greek: φρήν, <i>phrēn</i>, "mind"; and λόγος, <i>logos</i>, "knowledge") is a theory which claims to be able to determine character, personality traits and criminality on the basis of the shape of the head (i.e., by reading "bumps" and "fissures").</p> 	<p>Phrenology, which focuses on personality and character, should be distinguished from craniometry, which is the study of skull size, weight and shape, and physiognomy, the study of facial features. However, these disciplines have claimed the ability to predict personality traits or intelligence (in fields such as anthropology/ethnology), and were sometimes posed to "scientifically" justify racism. Nowadays, the basic premise that personality is determined by skull shape is generally dismissed as false. (http://en.wikipedia.org/wiki/Phrenology)</p>
<p>●Physiognomy</p> <p>Physiognomy (Gk. <i>physis</i>, nature and <i>gnomon</i>, judge, interpreter) is a theory based upon the idea that the assessment of the person's outer appearance, primarily the face, may give insights into one's character or personality. The term <i>physiognomy</i> can also refer to the general appearance of a person, object or terrain, without reference to its implied or scientific characteristics.</p>	<p>The principal promoter of physiognomy in modern times was the Swiss pastor Johann Kaspar Lavater (1741-1801) who was briefly a friend of Goethe.</p> <p>It is possible to infer character from features, if it is granted that the body and the soul are changed together by the natural affections: I say 'natural', for though perhaps by learning music a man has made some change in his soul, this is not one of those affections which are natural to us; rather I refer to passions and desires when I speak of natural emotions. If then this were granted and also that for each change there is a corresponding sign, and we could state the affection and sign proper to each kind of animal, we shall be able to infer character from features. (Trans. A. J. Jenkinson)</p>
<p>●Face diagnosis</p> <p>An Oriental visual diagnostic method to investigate medically the shape, the state of a tongue, the face figure and, the color of a patient's face.</p>	 <p>A face insists that all situation to be generated with the human body as a situation version of a brain and the bowels appears in a face.</p>
<p>●Anatomy</p> <p>Anatomy is the study of the structure of the bodies of people or animals. It is an important part of basic medical studies.</p>	<p>Scholars of cosmetology watch a figure of a bone and judge a figure of a muscle and skin.</p> 

Figure 3.1.1: The types of face study

We think that we can recognize personality on the basis of facial characteristics such as face types, form of eyes, nose, mouth, ears, complexion, bilateral symmetry, expression and hair style. Also we believe human faces have these recognizable characteristics. In some cases, people can remember face types such as, round type, angular type, egg type, or long type and form their impressions. We considered the triangle, the quadrangle, and the geometric figure of the diamond as standards for classifying face shapes. Faces were classified according to two parameters: first, face types we use to form an impression of another person; and secondly, the geometric form of the anatomical structure of the facial bones. We considered the skull and the facial bone as the frame of the face. The differences between the face types were discovered to lie in the shape and position of the eyebrow bones, cheek bones, and jawbone. See lines in figure 3.1.2.

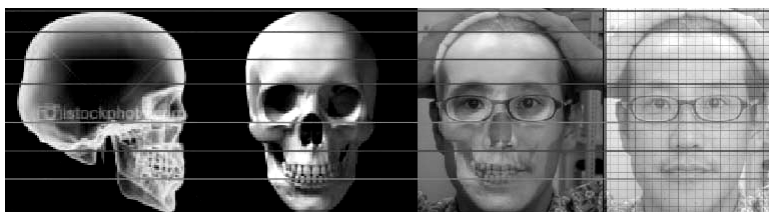


Figure 3.1.2: Consideration of facial bone for face

And then, we divided the face into 6 parts by a method that takes a threshold lengthwise. Afterwards, we marked 14 points around the face, and a geometric standard for the face measurement was created like "figure 3.1.3" using a threshold by proportion value of length from 'a' to 'h'.

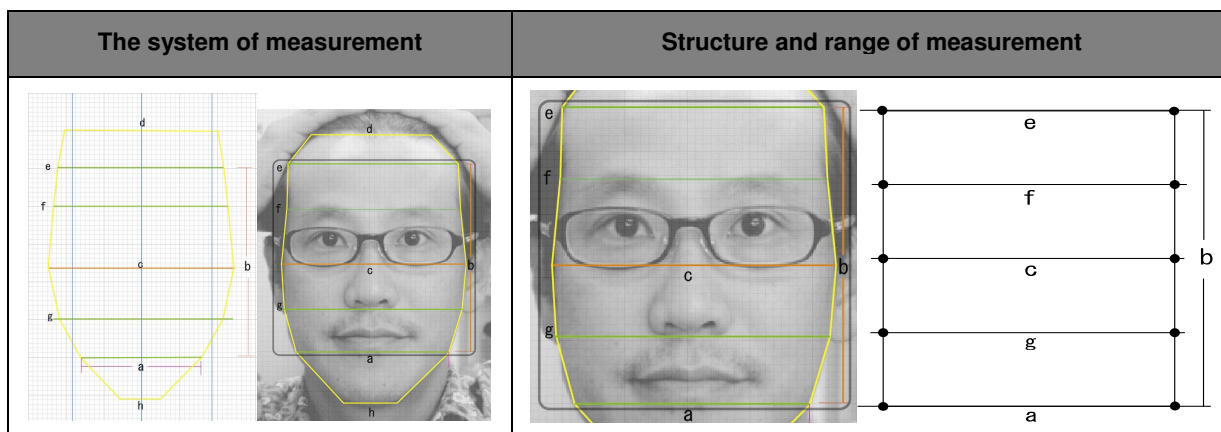


Figure 3.1.3: Geometric measurement of face

Subsequently, we printed a photograph of the face of each of the 56 participants. We examined the photographs and identified four distinct face types and its detail types on the basis of

proportion value of length from 'a' to 'h'. As for the measurement method, we were able to measure the face as shown on "figure 3.1.4," and create an algorithm determining the face type of these 9 persons:

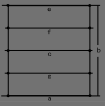
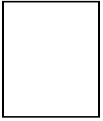












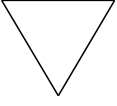






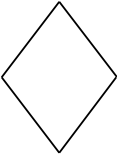






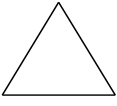




Basic Type	Detail Type	Parameter for Face Classification <i>unit : 1 $\geq \approx 0.95$</i>				Structure 	Sample face
		$\frac{f}{c}$	$\frac{g}{f}$	$\frac{b}{c}$	$\frac{e}{g}$		
		$\frac{f}{c} \approx 1$	$\frac{g}{f} \approx 1$	$\frac{b}{c} \geq 1$	$\frac{e}{g} \approx 1$		
				$\frac{e}{g} < 0.95$			
				$\frac{b}{c} < 1$	$\frac{e}{g} \approx 1$		
				$\frac{e}{g} < 0.95$			
		$\frac{f}{c} < 0.95$	$\frac{g}{f} < 0.95$	$\frac{b}{c} \geq 1$			
				$\frac{b}{c} < 1$			
		$\frac{f}{c} < 0.95$	$\frac{g}{f} \approx 1$	$\frac{b}{c} < 1$			
				$\frac{b}{c} \geq 1$			
		$\frac{f}{c} < 0.95$	$\frac{g}{f} > 0.95$	$\frac{b}{c} \geq 1$			
				$\frac{b}{c} < 1$			

Figure 3.1.4: Algorithm for the measurement of face type

3.2. CHOICE OF STIMULUS ELEMENT

We derived 5 geometric shapes (see Figure 3.2.1) resembling the facial shape of these 5 distinct faces as stimulus elements.

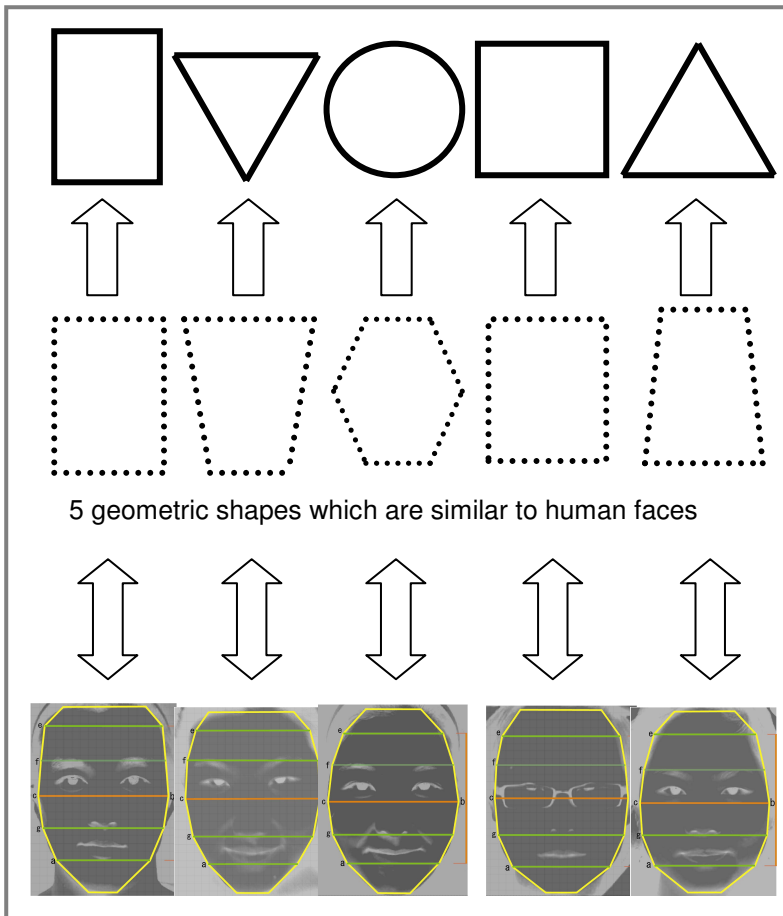


Figure 3.2.1: 5 geometric shapes which are similar to human faces

We noticed that these dotted 5 geometric shapes can be further abstracted to resemble the 5 shapes presented in the preference questionnaire (see Figure 3.3 1.3).

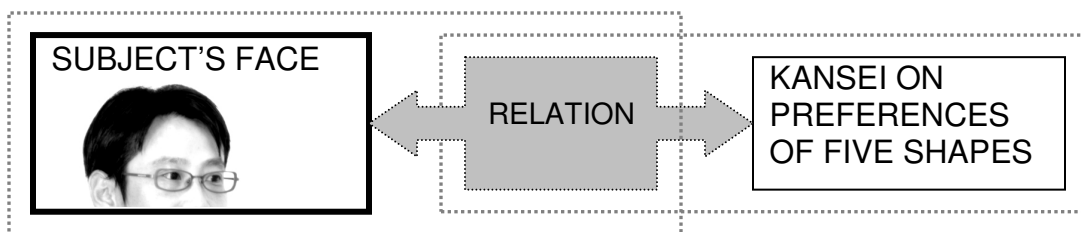


Figure 3.2.2: Face and relation of “Kansei”

Based on this relation, we further investigated the relationship between the participant’s facial shape and their preferred shape.

3.3. "KANSEI" EVALUATION OF SHAPE PREFERENCE

3.3.1. QUESTIONNAIRE DEVELOPMENT

Human beings experience and are educated in how to handle objects naturally. These experiences in shapes and colors significantly influence the formation of the person's humanity, "Kansei" and constitution. Considering that all objects coexist through space and time with human beings from birth to adulthood, we can imagine how these things shape a person. The human beings' perception of form might be different according to the person's living environment, experiences, education, age, and job. However, when we observe how people prefer certain kinds of shapes, we can see that human beings have certain inherent feelings about shape. This questionnaire survey aims to consider the "Kansei" concerning shape. It investigates the preference in terms of five figures (a rectangle, an inversed triangle, a circle, a square, and a triangle). This "Kansei" evaluation was aimed to find the relationship between a participant's face type and his/her shape preference using a photograph of the participant's face. The classification was then compared with the "Kansei" evaluation result on the participants' face type.

This paper is an opinion pool which tests shape and color
1. Please write down your profile.

Nationality: /Gender: /Age:
Healthy: /Occupation: /Best Food:
Tel: /Name:

No.

Body Picture Face Picture

Which shape/color do you like best?
2. Like the example, please write number "1" on the shape that you like most.
3. Please write number "2" on the shape that you like second.
4. Please let me take a picture of your face.

● Example

● How to evaluate

Blue	Red	Yellow	White	Black
(1)	()	(2)	()	()

● Past Age ()

Blue	Red	Yellow	White	Black
()	()	()	()	()

● Present

Blue	Red	Yellow	White	Black
()	()	()	()	()

We had to conduct the questionnaire survey twice. The 1st questionnaire is shown in figure 3.3.1.1. The following are the questionnaire instructions:

1st Type

1. Please write down your profile.
2. Like the example, please write number "1" on the shape that you like most.
3. Please write number "2" on the shape that you like second.
4. Please let me take a picture your face.

Figure 3.3.1.1: 1st Types of questionnaire

The problems with this questionnaire were addressed through a second survey. Two problems were discovered:

Problem	Solution
<ul style="list-style-type: none"> • Problem 1. Some participants checked both 1 and 2 for the first choice and did not check the second choice. 	Solution: We realized that the participants were choosing equally preferred shapes. Therefore, we changed from deciding the order of preference for a shape to giving a numerical value to each shape.
<ul style="list-style-type: none"> • Problem 2. We realized that the order of preference could vary depending on the positions of the shapes in the sample. 	Solution: we changed from a linear arrangement of the shapes to a circular one.

Figure 3.3.1.2: 1st Types of questionnaire

We solved the two above-mentioned problems and developed the questionnaire of figure 3.3.1.3. Below are the questionnaire instructions:

This paper is an opinion pool which tests shape and color

1. Please write down your profile.

Nationality: _____ /Gender: _____ /Age: _____
 Healthy: _____ /Occupation: _____ /Best Food: _____
 Tel: _____ /Name: _____

No. _____

Body Picture _____ Face Picture _____

Which shape/color do you like best?

2. Like the example, please write your preference degree of preference for each shape from 1 to 5.

3. Please let me take a picture of your face.

● Example

● How to evaluate

2nd Type

1. Please write down your profile.
2. Like the example, please write your preference degree of preference for each shape from 1 to 5.
3. Please let me take a picture of your face.

Figure 3.3.1.3: 2nd Type of questionnaire

3.3.2. QUESTIONNAIRE SURVEY

Before the questionnaire survey, we chose adults older than 20 and explained to the participants the purpose of the test, and administered the questionnaire.

56 participant's profile				
Nationality	Occupation	Major	Gender	Age
Korean	University students	Industrial design	14 male, 36 female	20 – 26 years old

As shown in the next Figure 3.3.2.1 and Figure 3.3.2.2, we evaluated the 56 participants' "Kansei" in preference for shapes.

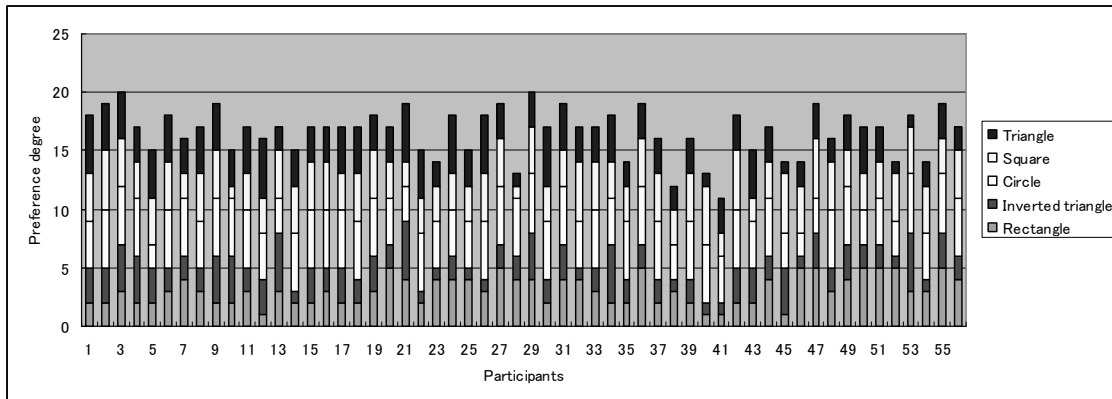


Figure 3.3.2.1: "Kansei" evaluation for an election for shape preference of 50 participants (X-axis; participants, Y- axis; personal preference)

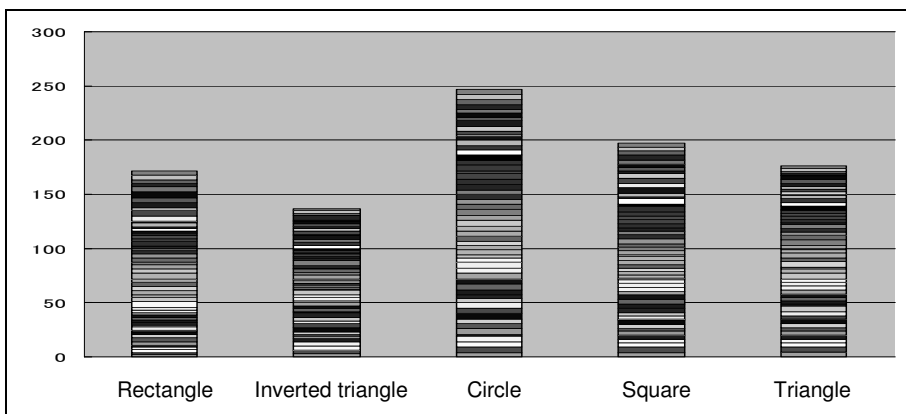


Figure 3.3.2.2: Unification analysis of shape preference (X-axis; each shape, Y- axis; total shape preference)

The result of the questionnaire shows that the most preferred shape was the circle, followed by square, triangle, rectangle, and finally inverted triangle.

4. ANALYSIS OF THE RELATIONSHIP BETWEEN "KANSEI" ON SHAPE PREFERENCE AND FACE SHAPES

4.1. 1st ANALYSIS OF QUESTIONNAIRE RESULT






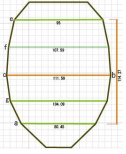








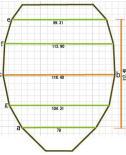




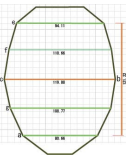




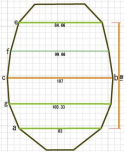




Application to face	Basic face type	Shapes					
		Detail face type & Application to face					
	Rectangle	  4 persons.	2.25	3.55	4.75	4.00	4.00
		  14 persons.	2.42	2.71	4.50	3.42	3.57
		  3 persons.	4.00	3.33	4.00	3.00	3.66
		  1 person.	2.00	1.00	5.00	3.00	4.00
22 subjects	Rectangle types' average		2.59	2.86	4.50	3.45	3.09
	Inverted Triangle	  18 persons.	3.22	2.00	4.61	3.50	3.05
		  4 persons.	2.25	2.25	4.50	3.00	3.25
22 subjects	Inverted Triangle types' average		3.04	2.04	4.59	3.40	3.09
	Diamond	  4 persons.	3.50	2.50	3.25	4.50	2.00
		  5 persons.	4.40	2.60	4.00	3.40	2.40
9 subjects	Diamond types' average		4.00	2.55	3.66	3.88	2.22
	Triangle	  3 persons.	4.00	2.00	4.66	3.66	2.33
		  0 persons.	0	0	0	0	0
3 subjects	Triangle types' average		4.00	2.00	4.66	3.66	2.33

Figure 4.1.1: Scientific Analysis for 10 kinds of face types and their preferences (max. 5, min.1) for 5 shapes

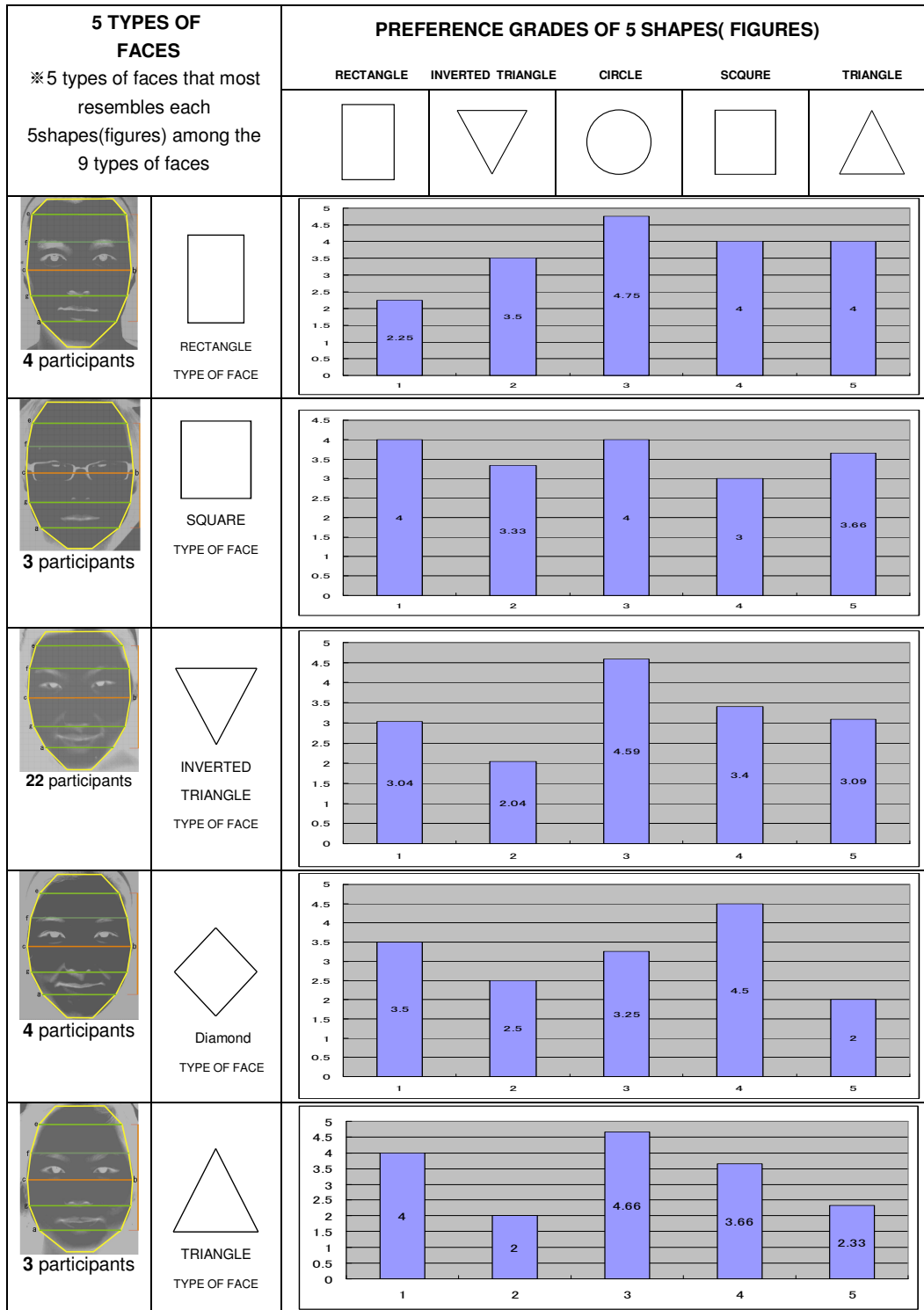


Figure 4.1.2: Analysis of the relationship between 5 shapes (figures) and 5 types of faces that most resembles each 5 shapes (figures) among the 9 types of faces

We will consider the "Kansei" for shape preference and its relationship with the participants' face shape in this paragraph. It was possible to measure the faces of 56 participants with a algorithm

for face measurement. The results were as follows: 22 participants' faces correspond to the rectangle shape face, 22 to the inverted triangle face, 9 to the diamond face, 3 to the triangular face (see Figure 4.1.1). The "figure 4.1.2" shows the "Kansei" evaluation results on preference for shape among the participants who have a face type resembling one of the 5 shapes. When we looked through the 5 graphs, the results show that participants have a low preference for a shape that most resembles their own face shape in the exception of a circle. "Figure 4.1.3" shows how to understand the result of this analysis.

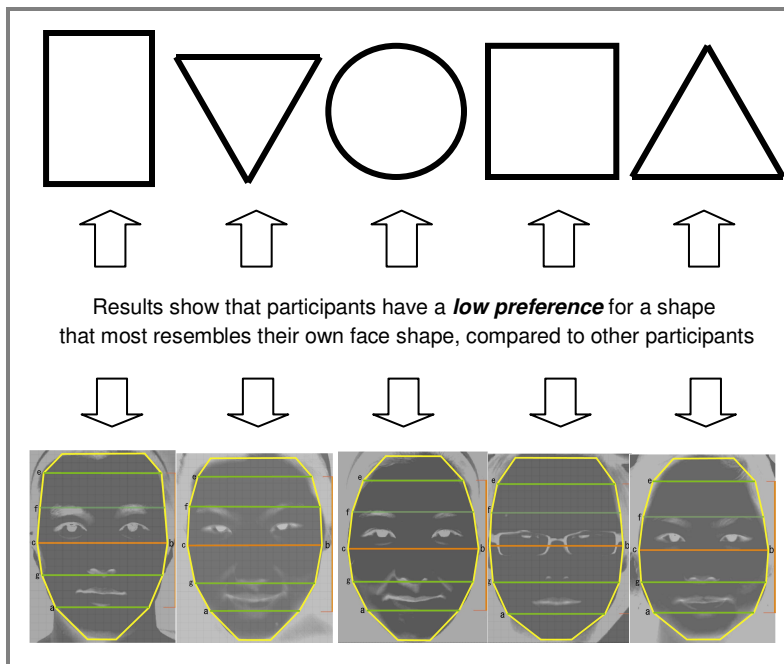


Figure 4.1.3: The relationship between 5 shapes (figures) and 5 types of faces that most resembles each 5 shapes (figures) among the 9 types of faces

4.2. 2nd ANALYSIS OF QUESTIONNAIRE RESULT

We further analyzed the relationship between high shape preference and face shape. To do this, we averaged the faces of participants who scored highest (5 degree) for each shape preference (5 people who prefer a triangle, 34 people who prefer a circle, 6 people who prefer a square, 9 people who prefer a rectangle, 4 people who prefer an inverted triangle).

We used 'Algorithm for the measurement of face type' by a method to grasp a lineament according to the group and extracted averaged face (see Figure 3.1.4).















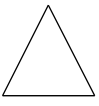

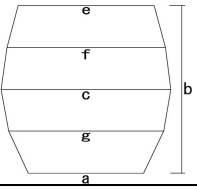
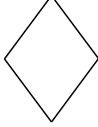
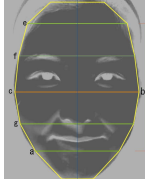

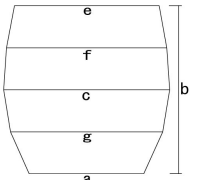

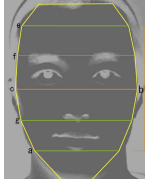
5 Shapes	The number of participants who have the highest preference (5degree) for each 5 shape									
	10kinds of face's type									
										
	0	0	1	0	2	0	2	3	1	0
	0	1	1	0	1	0	0	1	0	0
	3	10	1	1	12	2	1	2	2	0
	1	0	0	0	2	1	2	0	0	0
	1	1	1	0	2	0	0	0	0	0

Figure 4.2.1: Analysis for participants who have the highest preference (5 degree) for each 5 shapes

Next “Figure 4.2.2” shows the averaged face type of the participants who have the highest preference (5 degree) for each 5 shapes.

5 Shapes	The averaged face structure of participants who have the highest preference (5 degree) for each 5 shapes		Averaged face type	Application to face
	※unit : c= 100			
	e=80.09 f=93.40 c=100 g=91.32 a=67.92 b=100.66			
	e=87.14 f=96.51 c=100 g=91.72 a=69.06 b=102.17			

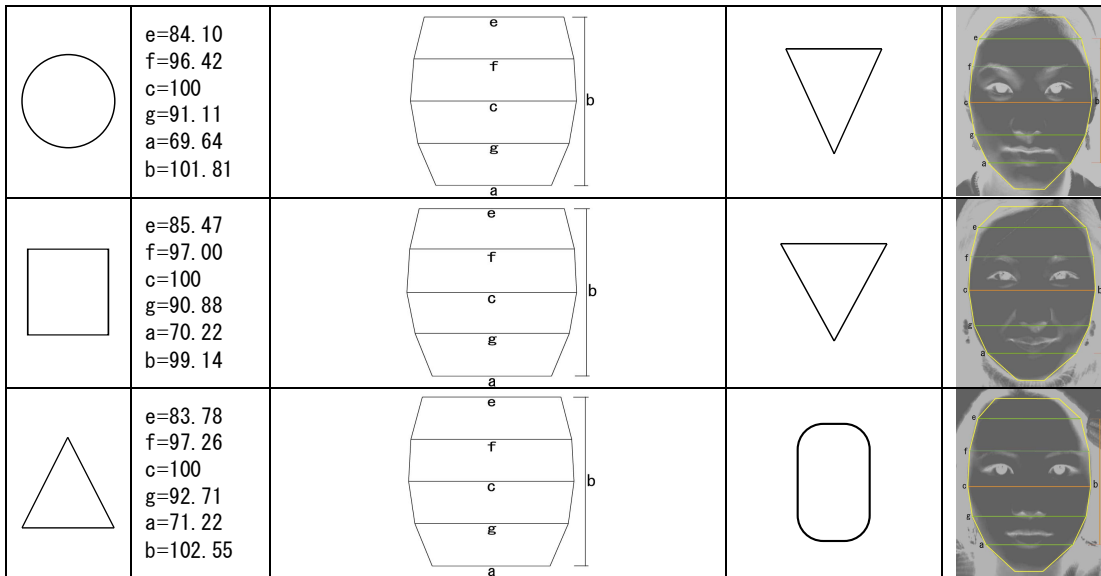


Figure 4.2.2: The averaged face type of participants who have the highest preference (5 degree) for each 5 shapes

When we looked through the 'Averaged face type', the results show that participants have the highest preference for a shape that does not resembles their own face shape. "Figure 4.2.3" shows how to understand the result of this analysis.

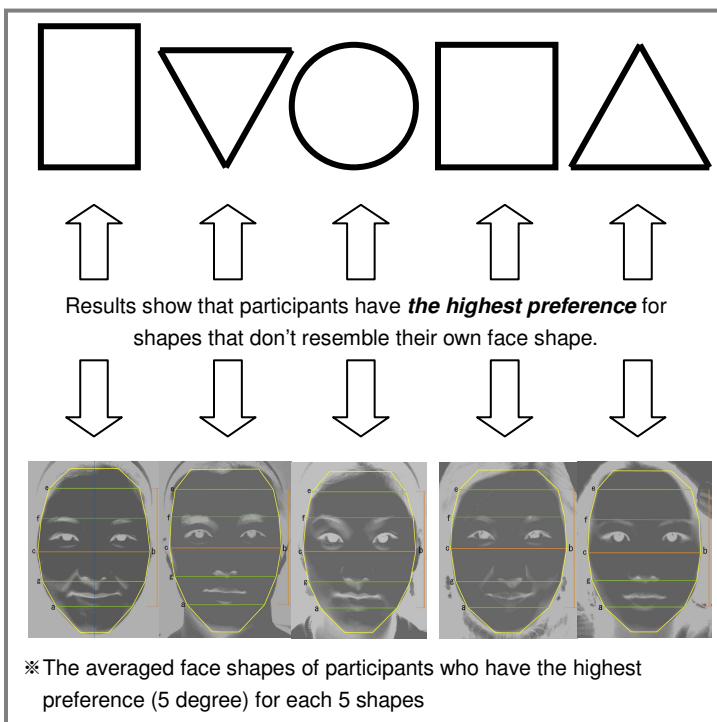


Figure 4.2.3: The relationship between 5 shapes and the averaged face shapes of participants who have the highest preference (5degree) for each 5 shape

5. CONCLUSION

This study aimed to research the "Kansei" a human being has in shape preference and the relationship it has with face shape. To take a standard for a face shape with precedence, we considered performing for an objective measurement method. The skull and facial bone are characteristics of a face that were considered on the anatomy side. We discovered differences in face shapes in terms of the shape and position of eyebrow bones, cheek bones, and the jawbone. Therefore, using a method to determine the threshold of a bone, it was possible to fix a geometric standard for face measurement. The face measurement algorithm was created from the basis of the nine face types identified from the 56 participants.

And the relationship between face shape and "Kansei" on preference for 5 shapes (figures) was researched. A "Kansei" evaluation was performed using 5 shapes (figures) of which resembled a face shape as a sensitivity stimulation element. As a result, we could analyze the high and low preference for 5 shapes (see Figure 4.1.3, 4.2.3).

From this study, we can see that in general, people prefer shapes that don't resemble the shape of their own face with the exception of a circle. Such tendencies will help recognize personality, and will be useful for developing a new device that satisfies a desire of "Kansei".

6. ACKNOWLEDGMENT

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